Curriculum Vitae

Dr. Natt MAKUL

❖ 2023 Stanford's list World Top 2% scientists

❖ 2022 Stanford's list World Top 2% scientists

(Associate Professor, Pending Official Royal Appointment for full Professor)

H-Index (WOS) = 25	H-Index (Scopus) = 26	H-Index (Scholar) = 31

1. Personal Information

Name: Natt (ณัฏฐ์) Family name: Makul (มากุล) Gent: Male

Race: Thai (ไทย) Nationality: Thai (ไทย)

2. Education Profile

Degree	Major	Institute	Year of Graduation
B. Eng.	Civil Engineering	Thammasat University	2000
M. Eng.	Structural Engineering (TRF Grant)	Thammasat University	2005
Ph.D.	Civil Engineering (RGJ-TRF Grant)	Thammasat University	2010

3. Field of Interest

- Microwave Heating in cement-based materials;
- Utilization of waste materials (Fly Ash, Rice Husk Ash, Limestone Powder, Steel Powder, Foundry Sand, Dry Powder Sludge Ash etc.) as concrete materials;
- Behaviors of Portland cement-based materials;
- Microstructure characteristics of concretes
- Special testing and analysis of concretes

4. Professional Activities

- International committee, American Society for Testing and Materials (ASTM)
- HIVE alumni network - Academy of Medical Sciences
- Member, American Physical Society
- Member, Council of Engineering
- Member, Thai Concrete Association

5. Work Experience

1. Associate professor: Statics, Solid mechanics, Structure analysis
   Phranakhon Rajabhat University (2019- present)
2. Assistant professor: Statics, Solid mechanics, Structure analysis
   Phranakhon Rajabhat University (2013-2018)
3. Lecturer: Special lecturer (Statics, Solid mechanics, Structure analysis)
   Phranakhon Rajabhat University (2010-2013)
4. Research assistant: Materials research Institute, The Pennsylvania State University (2009-2010)
5. Quality control and assurance engineer: Asia Cement Products Co.,Ltd. (2006 - 2009 years)
6. Lecturer: Special lecturer (Statics, Solid mechanics, Structure analysis)
   Phranakhon Rajabhat University (2004-2005)
7. Consultant
   Civil serv Engineering and consultant Co, Ltd. (2008-2009)
   Sihaseikai Tech Co, Ltd. (2008-2009)
8. Consultant: Kaennakorn Concrete (2001) Co., Ltd. (2013-2015)

6. Research Activities

6.1 Grant and/or Funding

1. Mechanical Properties and Durability of Portland cement Containing Slag, Supplementary Curriculum Grant of Thammasat University, 2001. (Research Assistant).

2. Properties of Concrete Mixed with Recycling Water from Ready-Mixed Concrete Plant, Siam City Cement Company LTD., 2002. (Research Assistant).

3. Utilization of Wasted Sand from Engine Factory as A Concrete Component, The Thailand Research Fund; Contact No. RDG4650019, 2003. (Researcher).

4. The Use of Sludge Water from Ready - mixed Concrete Plant as Mixing Concrete, The Thailand Research Fund; Contact No. RDG4650032, 2003. (Researcher)

5. Development of Lightweight Masonry Cement Products, The Ministry of Energy; Contact No. 83/2547, 2004. (Researcher).

6. Utilization of Microwave Energy for Improving Mechanical Properties of Concrete, National Metal and Materials Technology Center, Thailand; 2004. (Researcher)

7. Development of Reactive Powder Concrete, The Thailand Research Fund; Contact No. RDG4850044, 2004. (Researcher)

8. The Royal Golden Jubilee PhD Program Contact No. PHD/0030/2549, 2006. (Research Student)

9. Research assistant partial fund From The Pennsylvania State University, 2009. (Research Assistant).

10. TRF-CHE Research Grant for New Scholar, Contact No. MRG5580041, 2012.

11. TRF Research Grant for New Researcher, Contact No. MRG5780255, 2014.

12. European Union's Horizon 2020 Research and Innovation Program under grant agreement no. 777823, Tailor-made Recycled Aggregate Concretes (TRAC), 2020 – 2024.

13. Thammasat University Research Fund, Contract No. TUGR 2/29/2562.

14. Academy of Medical Sciences 2021, GCRF Networking Grants - Round 7, Capacity and capability building to develop recycled aggregate concrete in South East Asia.

15. สำนักงานการวิจัยแห่งชาติ (วช.), กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (กองทุน ววน.): ทุนพัฒนานักวิจัยรุ่นกลาง ประจำปี 2566, การบ่มเร่งด้วยพลังงานไมโครเวฟเพื่อเพิ่มการพัฒนากำลังอัดในช่วงต้นของชิ้นส่วนคอนกรีตสำเร็จรูปที่ผสมเศษคอนกรีตใช้แล้วด้วยการใช้ระบบผสมผสานการป้อนคลื่นไมโครเวฟหลายทิศทางร่วมกับลมร้อนแบบต่อเนื่องเชิงพาณิชย์, 2022 – 2025.

16. สำนักงานการวิจัยแห่งชาติ (วช.), กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (กองทุน ววน.): กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (กองทุน ววน.): ผลกระทบของสนามไฟฟ้าพัลส์สำหรับการบ่มเร่งเศษคอนกรีตมวลรวมประสิทธิภาพสูงผสมเถ้าชีวมวลที่ได้จากโรงพลังงานไฟฟ้าที่มีต่อการพัฒนาโครงสร้างและคุณสมบัติ, 2023 – 2024.

17. European Union's Horizon 2020 Research and Innovation Program, LITEFLOATCON (light-weight high performance concrete (LWHPC)), 2023 - 2027.

18. ศูนย์กลางศูนย์รวมผู้เชี่ยวชาญการใช้ประโยชน์จากพลังงานคลื่นแม่เหล็กไฟฟ้าในงานวิศวกรรมทางการแพทย์ 2567 กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (กองทุน ววน.): กลุ่มเรื่อง การพัฒนาศูนย์รวมผู้เชี่ยวชาญ (Hub of Talents) และศูนย์กลางด้านความรู้ (Hub of Knowledge) ของอาเซียน สำนักงานการวิจัยแห่งชาติ (วช.)

19. การวิจัยและพัฒนาเทคโนโลยีขั้นสูงด้านวิศวกรรมการแพทย์ในอนาคต (การวินิจฉัยล่วงหน้าสำหรับกระบวนค้นหาและการบำบัดก้อนมะเร็งระยะเริ่มแรกภายในอวัยวะมนุษย์ด้วยเทคนิคคลื่นแม่เหล็กไฟฟ้าและ คลื่นทางกล ด้วยแบบจำลองเชิงตัวเลข 3 มิติขั้นสูง เพื่อจำลองการเคลื่อนที่ของ droplets จากผู้ติดเชื้อ COVID-19)

20. กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (กองทุน ววน.): ทุนศาสตราจารย์วิจัยดีเด่น ประจำปี 2565 สำนักงานการวิจัยแห่งชาติ (วช.)

6.2 Research Articles

6.2.1 International Journal

1. Chatveera, B., Lertwattanaruk, P. & **Makul, N**. (2006). Effect of Sludge Water from Ready-mixed Concrete Plant on Properties and Durability of Concrete. Cement and Concrete Composites, Vol. 28, No. 5, Elsevier Ltd., England, 441-450. Impact Factor: 0.70

2. Rattanadecho, P., Suwannapum, N., Chatveera, B., Atong, D. & **Makul, N.** (2008). Development of Compressive Strength of Cement Paste under Accelerated Curing by Using A Continuous Microwave Thermal Processor. Materials Science and Engineering A, Vol. 472, Elsevier Ltd., England, 299-307. Impact factor 1.40

3. **Makul N.***, Chatveera B. & Rattanadecho P. (2008). Use of microwave energy for accelerated curing of concrete: a review. Songklanakarin J. Sci. Technol, Vol. 31 (1), Thailand. 1-13. Impact factor 1.0

*** Corresponding author**

4. **Natt Makul*** & Agrawal D.K. (2009). Microwave (2.45 GHz)-assisted rapid sintering of SiO_2-rich rice husk ash, Materials Letters, Impact Factor 1.743

*** Corresponding author**

5. **Makul N.** & Rattanadecho P. (2010). Microwave pre-curing of natural rubber-compounding using a rectangular wave guide, International Communications in Heat and Mass Transfer 2010, 914 - 923, Impact Factor 1.189.

6. **Makul N. ***, Keangin P., Rattanadecho P., Chatveera B., & Agrawal D.K. (2010). Microwave-assisted heating of cementitious materials: relative dielectric properties, mechanical property, and experimental and numerical heat transfer characteristics, International Communications in Heat and Mass Transfer 2010, 1096 - 1105, Impact Factor 1.189

*** Corresponding author**

7. **Makul N.***, Rattanadecho P. & Agrawal D.K. (2010). Microwave curing at an operating frequency of 2.45 GHz of Portland cement paste at early-stage using a multi-modes cavity: Experimental and numerical analysis on microstructural and heat transfer characteristics, International Communications in Heat and Mass Transfer, 1487-1495, Impact Factor 1.189

*** Corresponding author**

8. **Makul N.***, Rattanadecho P., Chatveera B., & Agrawal D.K. (2010). Microstructures and mechanical properties of Portland cement pastes at early age subjected to microwave accelerated-curing with a multi-mode cavity, Journal of ceramics processing research, 12(1), pp. 62-69, Impact Factor 0.402

*** Corresponding author**

9. **Makul N.*** & Agrawal D.K., (2011). Influences of microwave-accelerated curing procedures on microstructure and strength characterization of Type I-Portland cement pastes Journal of ceramics processing research, pp. 376-381, Impact Factor 0.402

*** Corresponding author**

10. **Makul N.*** & Agrawal D.K. (2011), "Microwave-accelerated curing of cement-based materials: compressive strength and maturity modeling," Key Engineering Materials, 484, 210-221, Impact Factor 0.224

*** Corresponding author**

11. **Makul N.*** & Agrawal D.K., (2012). Comparison of the microstructure and compressive strength of Type 1 Portland cement paste between accelerated curing methods by microwave energy and autoclaving, and a saturated-lime deionized water curing method, Journal of Ceramic Processing Research, 13(2), pp. 174-177, Impact Factor 0.481

*** Corresponding author**

12. Lertwattanaruk, P., **Makul, N.** & Siripattarapravat. C. (2012). Utilization of ground waste seashells in cement mortars for masonry and plastering, Journal of Environmental Management, Vol. 111, pp. 133-141. Impact Factor: 3.131

13. Sua-iam, G. & **Makul, N.*** (2013). Use of limestone powder during incorporation of Pb-containing cathode ray tube waste in self-compacting concrete, Journal of Environmental Management, Vol. 128, pp. 931-940. Impact Factor: 3.131

*** Corresponding author**

14. Sua-iam, G. & **Makul, N.*** (2013). Use of Unprocessed Rice Husk Ash and Pulverized Fuel Ash in the Production of Self-compacting Concrete, IERI Procedia, Vol. 5, pp. 298-303. Impact Factor: -

*** Corresponding author**

15. Sua-iam, G. & **Makul, N.*** (2013). Utilization of limestone powder to improve the properties of self-compacting concrete incorporating high volumes of untreated rice husk ash as fine aggregate, Construction and Building Materials, Vol. 38, pp. 455-464. Impact Factor 2.421.

*** Corresponding author**

16. Sua-iam, G. & **Makul, N.*** (2013). Use of recycled alumina as fine aggregate replacement in self-compacting concrete. Construction and Building Materials, Vol. 47, pp. 701-710. Impact Factor 2.421.

*** Corresponding author**

17. Sua-iam, G.& **Makul, N.*** (2013). Use of increasing amounts of bagasse ash waste to produce self-compacting concrete by adding limestone powder waste, Journal of Cleaner Production, Vol. 57, pp. 308-319. Impact Factor 4.959

*** Corresponding author**

18. Lairaksa, N., Moon, A. & **Makul N.*** (2013). Utilization of cathode ray tube waste: Encapsulation of PbO-containing funnel glass in Portland cement clinker, Journal of Environmental Management, Vol. 117, pp. 180-186. (Impact Factor: 3.131)

*** Corresponding author**

19. **Makul, N.*,** Rattanadecho, P. & Agrawal, D. (2014). Applications of microwave energy in cement and concrete – A review, Renewable & Sustainable Energy Reviews, Vol.37, pp. 715-733. Impact Factor 5.901

*** Corresponding author**

20. Sua-iam, G. & **Makul, N.* (**2014). Utilization of high volumes of unprocessed lignite-coal fly ash and rice husk ash in self-consolidating concrete, Journal of Cleaner Production, Vol. 78, pp. 184-194. Impact Factor 4.959

*** Corresponding author**

21. Sua-iam, G.& **Makul, N.*** (2015). Utilization of coal- and biomass-fired ash in the production of self-consolidating concrete: a literature review, Journal of Cleaner Production, Vol. 100, pp. 59-76. Impact Factor 4.959

*** Corresponding author**

22. Sua-iam, G.& **Makul, N.*** (2015). Rheological and mechanical properties of cement–fly ash self-consolidating concrete incorporating high volumes of alumina-based material as fine aggregate, Construction and Building Materials, Vol. 95, pp. 736-747. Impact Factor 2.421.

*** Corresponding author**

23. Sua-iam, G.& **Makul, N.*** (2016). Characteristics and utilization of sugarcane filter cake waste in the production of lightweight foamed concrete, Journal of Cleaner Production, Vol. 126, pp. 118-133. Impact Factor 4.959

*** Corresponding author**

24. Rattanadecho, P., **Makul, N.**, Pichaicherd, A., Chanamai C., Rungroungdouyboon B. (2016). A novel rapid microwave-thermal process for accelerated curing of concrete: Prototype design, optimal process and experimental investigations, Construction and Building Materials, Vol. 123, pp. 768-784. Impact Factor 2.421.

25. **Makul, N.*** (2016). Innovative hybrid curing method for accelerating the strength of high-performance cement paste using microwave heating coupling with low-pressure processing. Construction and Building Materials, Vol. 105, pp. 245-252. Impact Factor 2.421.

*** Corresponding author**

26. Sua-iam, G., Sokrai, P. & **Makul, N.*** (2017). Novel ternary blends of Type 1 Portland cement, residual rice husk ash, and limestone powder to improve the properties of

self-compacting concrete, construction and Building Materials, Vol. 125, pp. 1028-1034. Impact Factor 2.421.

*** Corresponding author**

27. Sua-iam, G.& **Makul, N.*** (2017). Effect of incinerated sugarcane filter cake on the properties of self-compacting concrete, Construction and Building Materials, Vol. 130, pp. 32-40. Impact Factor 2.421.

*** Corresponding author**

28. **Natt Makul***, Phadungsak Rattanadecho, Amphol Pichaicherd, Accelerated microwave curing of concrete: A design and performance-related experiments, Cement and Concrete Composites, Volume 83 October 2017, Pages 415-426. Impact Factor 6.257.

*** Corresponding author**

29. Gritsada Sua-iam, **Natt Makul***, Incorporation of high-volume fly ash waste and high-volume recycled alumina waste in the production of self-consolidating concrete, Journal of Cleaner Production, Volume 15915 August 2017, Pages 194-206. Impact Factor 7.246.

*** Corresponding author**

30. Gritsada Sua-Iam, **Natt Makul***, Effect of incinerated sugarcane filter cake on the properties of self-compacting concrete, Construction and Building Materials, Volume 13015 January 2017Pages 32-40. Impact Factor 4.419.

*** Corresponding author**

31. **Natt Makul***, Gritsada Sua-Iam, Innovative utilization of foundry sand waste obtained from the manufacture of automobile engine parts as a cement replacement material in concrete production, Journal of Cleaner Production, Volume 199, 20 October 2018, Pages 305-320.

*** Corresponding author**

32. Natt Makul, Somsak Vongpradubchai, Phadungsak Rattanadecho*, An experimental study of microwave drying under low pressure to accelerate the curing of Portland cement pastes using a combined unsymmetrical double-fed microwave and vacuum system, International Journal of Heat and Mass TransferVolume 127, Part ADecember 2018, Pages 179-192.

33. **Natt Makul***, Prakasit Sokrai, Influences of fine waste foundry sand from the automobile engine-part casting process and water-cementitious ratio on the properties of concrete: A new approach to use of a partial cement replacement material, Journal of Building Engineering, Volume 20 November 2018, Pages 544-558.

*** Corresponding author**

34. **Natt Makul***, Gritsada Sua-iam, Effect of granular urea on the properties of self-consolidating concrete incorporating untreated rice husk ash: Flowability, compressive strength and temperature rise, Construction and Building Materials, Volume 162, 20 February 2018, Pages 489-502.

*** Corresponding author**

35. Pusit Lertwattanaruk, Gritsada Sua-iam, **Natt Makul**, Effects of calcium carbonate powder on the fresh and hardened properties of self-consolidating concrete incorporating untreated rice husk ash, Journal of Cleaner Production, Volume 172, 20 January 2018, Pages 3265-3278.

36. Gritsada Sua-iam, **Natt Makul**, Shanshan Cheng, Prakasit Sokrai, Workability and compressive strength development of self-consolidating concrete incorporating rice husk ash and foundry sand waste – A preliminary experimental study, Construction and Building Materials, Volume 228, 20 December 2019, Article 116813.

37. **Natt Makul**, Combined use of untreated-waste rice husk ash and foundry sand waste in high-performance self-consolidating concrete, Results in Materials, Volume 1 August 2019, Article 100014.

38. **Natt Makul**, Utilization of microwave-accelerated heating and dewatering in low-pressure conditions to accelerated-cure Type-I cement paste for early-age compressive strength development, Journal of Building Engineering, Volume 26, November 2019, Article 100920.

39. **Natt Makul**, Production of high-early-compressive-strength Portland cement paste using low-pressure microwave-accelerated heating and curing: processing characteristics and factors affected, Heliyon, Volume 5, Issue 7, July 2019, Article e02098.

40. **Natt Makul**, Effect of low-pressure microwave-accelerated curing on the drying shrinkage and water permeability of Portland cement pastes, Case Studies in Construction Materials, Volume 13, December 2020, Article e00358.

41. **Natt Makul**, Modern sustainable cement and concrete composites: Review of current status, challenges and guidelines, Sustainable Materials and Technologies, Volume 25, September 2020, Article e00155.

42. **Natt Makul**, Cost-benefit analysis of the production of ready-mixed high-performance concrete made with recycled concrete aggregate: A case study in Thailand, Heliyon, Volume 6, Issue 6, June 2020, Article e04135.

43. **Natt Makul**, Advanced smart concrete - A review of current progress, benefits and challenges, Journal of Cleaner Production, Volume 274, 20 November 2020Article 122899.

44. Chanchai Vanlisuta , **Natt Makul**, COST SAVINGS AND BREAK-EVEN POINT OF SOLAR CELL INSTALLATION IN URBAN THAILAND, Issue 8, 2889-2905, DOI: 10.37200/IJPR/V24I8/PR280309

45. **Natt Makul**, A review on methods to improve the quality of recycled concrete aggregates, Journal of Sustainable Cement-Based Materials, 2020, DOI: 10.1080/ 21650373.2020.1748742

46. Pongsakon Promsawat, Burachat Chatveera, Gritsada Sua-iam, **Natt Makul**, Properties of self-compacting concrete prepared with ternary Portland cement-high volume fly ash-calcium carbonate blends, Case Studies in Construction Materials, December 2020, Vol.13, Article e00426.

47. **Natt Makul**, Advanced smart concrete - A review of current progress, benefits and challenges, Journal of Cleaner Production, 20 November 2020, Vol. 274, Article 122899.

48. **Natt Makul**, Modified cost-benefit analysis of the production of ready-mixed self-consolidating concrete prepared with a recycled concrete aggregate, Journal of Construction Engr. & Management, Vol. 147, Issue 4 (April 2021), https://doi.org/10.1061/(ASCE)CO.1943-7862.0002019

49. **Makul, N.**; Fediuk, R.; Amran, M.; Zeyad, A.M.; Murali, G.; Vatin, N.; Klyuev, S.; Ozbakkaloglu, T.; Vasilev, Y. Use of Recycled Concrete Aggregates in Production of Green Cement-Based Concrete Composites: A Review. Crystals 2021, 11, 232. doi: 10.3390/cryst11030232

50. **Makul, N**.; Fediuk, R.; Amran, M.; Zeyad, A.M.; de Azevedo, A.R.G.; Klyuev, S.; Vatin, N.; Karelina, M. Capacity to Develop Recycled Aggregate Concrete in South East Asia. Buildings 2021, 11, 234. doi: 10.3390/buildings11060234

51. **Makul, N.**; Fediuk, R.; Amran, M.; Zeyad, A.M.; Klyuev, S.; Chulkova, I.; Ozbakkaloglu, T.; Vatin, N.; Karelina, M.; Azevedo, A. Design Strategy for Recycled Aggregate Concrete: A Review of Status and Future Perspectives. Crystals 2021, 11, 695. doi: 10.3390/cryst11060695

52. Lertwattanaruk, P.; **Makul, N.** Influence of Ground Calcium Carbonate Waste on the Properties of Green Self-Consolidating Concrete Prepared by Low-Quality Bagasse Ash and Rice Husk Ash. Materials 2021, 14, 4232. doi: 10.3390/ma14154232

53. **Natt Makul,** Roman Fediuk, MaciejSzelagc, Advanced interactions of cement-based materials with microorganisms: A review and future perspective, Journal of Building Engineering, Volume 45, January 2022, 103458.

54. Mugahed Amran, **Natt Makul**, Roman Fediuk, Yeong Huei Lee, Nikolai Ivanovich Vatin, Yee Yong Lee, Kachalla Mohammed, Global carbon recoverability experiences from the cement industry, Case Studies in Construction Materials, Volume 17, 2022, e01439.

55. Mugahed Amran, Shan-Shan Huang, Ali M. Onaizi, **Natt Makul**, Hakim S. Abdelgader, Togay Ozbakkaloglu, Recent trends in ultra-high-performance concrete (UHPC): Current status, challenges, and future prospects, Construction and Building Materials, Volume 352, 2022, 129029.

56. Mugahed Amran, G. Murali, **Natt Makul**, Marzena Kurpińska, Moncef L. Nehdi, Fire-induced spalling of ultra-high-performance concrete: A systematic critical review, Construction and Building Materials, Volume 373, 2023, 130869.

57. Gritsada Sua-iam, **Natt Makul**, Recycling prestressed concrete pile waste to produce green self-compacting concrete, Journal of Materials Research and Technology, Volume 24, 2023, 4587-4600.

6.2.2 International Journal Reviewer

1. International Journal of Physical Sciences (2009-present)
   http://www.academicjournals.org/IJPS
2. Editorial team: Journal of Chemical Engineering and Materials Science
   http://www.academicjournals.org/jcems
3. Journal of Alloys and Compounds
   http://ees.elsevier.com/jalcom/
4. International of heat and mass transfer
   http://ees.elsevier.com/inthandmass/
5. Journal of Environmental Management
   http://ees.elsevier.com/jema/1.asp?i=216703&l=TQ1C5Z1V
6. Construction and Building Materials
   http://www.journals.elsevier.com/construction-and-building-materials/
7. Journal of Cleaner Production
   http://www.journals.elsevier.com/journal-of-cleaner-production/
8. Renewable & Sustainable Energy Reviews
   http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/
9. Waste Management
   https://ees.elsevier.com/wm/
10. Journal of Microwave Power and Electromagnetic Energy
    http://tpee.edmgr.com/

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6.2.3 National Journal

1. Chatveera, B. and **Makul, N.** (2001), Effect of Lignite Bottom Ash on Cement Paste Properties. Research and Development Journal of The Engineering Institute of Thailand, Vol. 12, No. 4, Bangkok, Thailand, 1-8.

2. Chatveera, B. and **Makul, N.** (2003), Durability of Fly Ash Cement Containing Limestone Powder. Research and Development Journal of The Engineering Institute of Thailand, Vol. 14, No. 3, Bangkok, Thailand, 8-16.

3. Chatveera, B. and **Makul, N.** (2004), Effect of Curing Temperature on Mechanical Properties of Cement Mixed with White Rice Husk Ash Paste. KMUTT Research and Development Journal, Vol. 27, No. 1, Bangkok, Thailand, 49-61.

4. Chatveera, B. and **Makul, N.** (2004), Mechanical Properties and Durability of Portland Cement Containing Ground Slag by Los Angeles Machine. KMUTT Research and Development Journal, Vol. 27, No. 2, Bangkok, Thailand, 157-174.

5. Chatveera, B., **Makul, N**. and Nuchprayool, N. (2004), Mechanical Properties of Concrete Containing Sludge Water from Ready-mixed Concrete Plant. Research and

Development Journal of The Engineering Institute of Thailand, Vol. 15, No. 2, Bangkok, Thailand, 17-23.

6. Chatveera, B. and **Makul, N.** (2004), Effect of Very Fine Ground White RHA on Mechanical Properties of Concrete. Research and Development Journal of The Engineering Institute of Thailand, Vol. 15, No. 3, Bangkok, Thailand, 1-7.

7. Chatveera, B., **Makul, N.** and Ruxsadee, B. (2004) Use of Unground Rice Husk Ash in Concrete Block Production. KMUTT Research and Development Journal, Vol. 27, No. 4, Bangkok, Thailand, 483-496.

8. Chatveera, B. and **Makul, N.** (2004), Influence of PFA and Limestone Powder on Mechanical Properties of Concrete. Research and Development Journal of The Engineering Institute of Thailand, Vol. 15, No. 4, Bangkok, Thailand, 16-28.

9. Chatveera, B., Lertwattanaruk, P. and **Makul, N.** (2005) Effect of Sludge Water from Ready-mixed Concrete Plant on Properties and Durability of Concrete. Research and Development Journal of The Engineering Institute of Thailand, Vol. 16, No. 2, Bangkok, Thailand, 9-20.

10. **Makul, N**. and Chatveera, B. (2005) Influence of Foundry Sand Powder from Automobile Engine Casting on Properties of Ready-mixed Concrete. Research and Development Journal of The Engineering Institute of Thailand, Vol. 16, No. 4, Bangkok, Thailand, 1-10.

11. Chatveera, B., Ratanadecho, P., Atong, D., **Makul, N.** and Suwannapum, N. (2005) Development of Compressive Strength of Cement Paste with Microwave Energy by Using A Continuous Belt Furnace. Research and Development Journal of The Engineering Institute of Thailand, Vol. 16, No. 4, Bangkok, Thailand, 11-17.

12. Chatveera, B., **Makul, N.** and Rodanan, A. (2006) Durability of Cement Mortar Containing Black Rice Husk Ash under Sodium Sulfate and Magnesium Sulfate Attack. KMUTT Research and Development Journal, Vol. 29, No. 1, Bangkok, Thailand, 55-71.

13. **Makul, N.** and Chatveera, B. (2006) Effects of Foundry Sand Powder from Engine Parts Casting on Ready-mixed Concrete Properties. KMUTT Research and Development Journal, Vol. 29, No. 2, Bangkok, Thailand, 215-228.

14. Chatveera, B. and **Makul, N.** (2007) Effect of Diatomite on Properties of Lightweight Masonry. Research and Development Journal of The Engineering Institute of Thailand, Vol. 18, No. 1, Bangkok, Thailand, 1-7.

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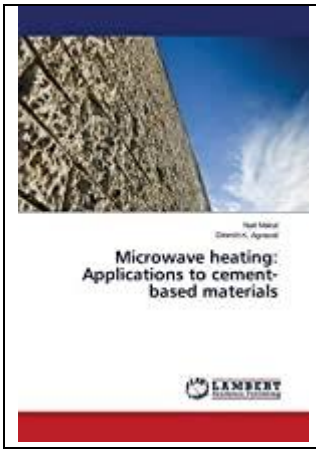
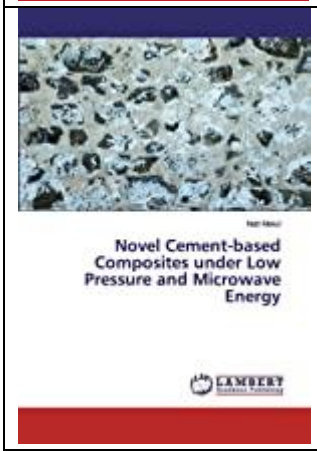
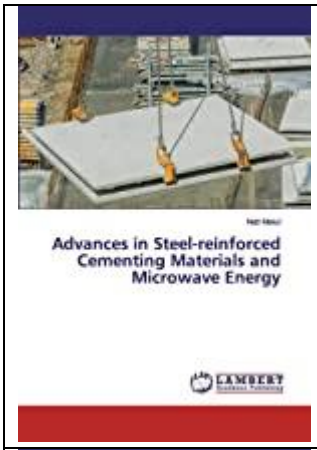
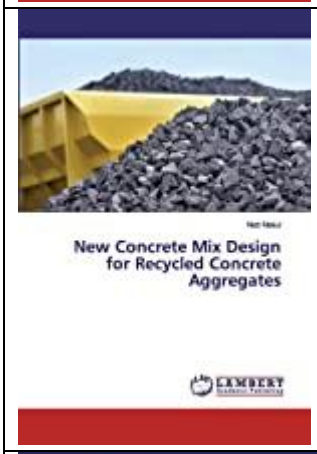
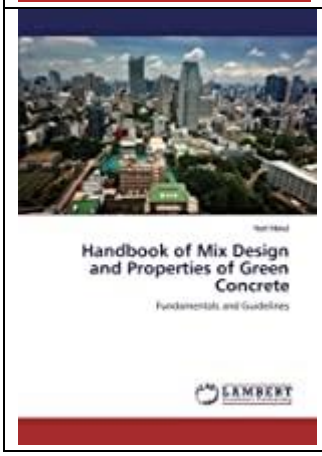
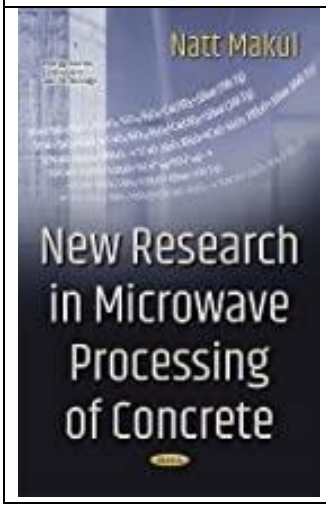
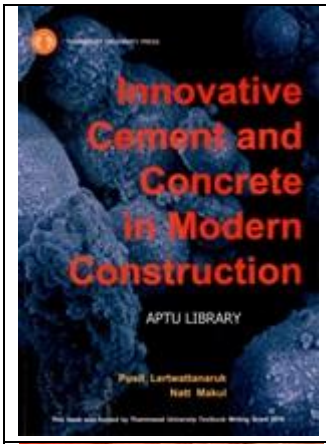
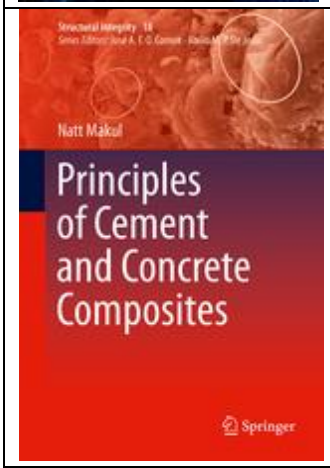
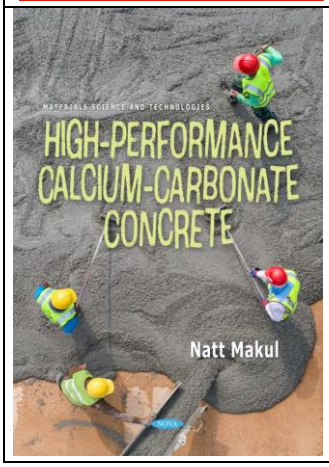
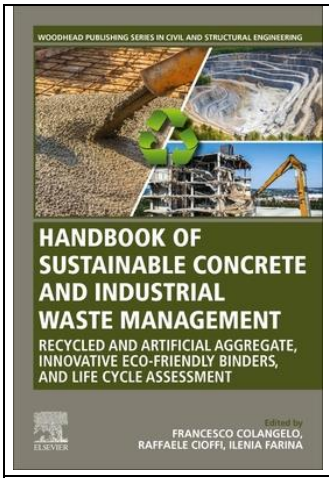
6.3 Book

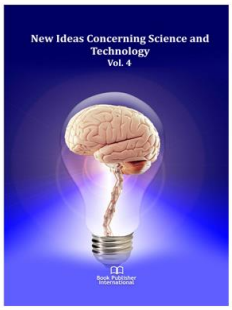
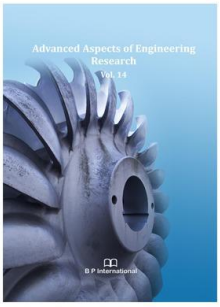
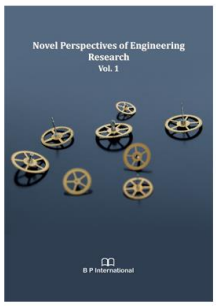
	Microwave heating: Applications to cement-based materials Paperback - March 2014
	Novel Cement-based Composites under Low Pressure and Microwave Energy by Natt Makul

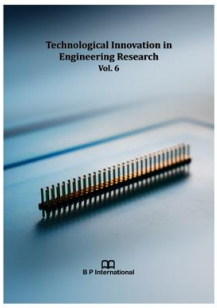
	Advances in Steel-reinforced Cementing Materials and Microwave Energy
	New Concrete Mix Design for Recycled Concrete Aggregates
	Handbook of Mix Design and Properties of Green Concrete: Fundamentals and Guidelines

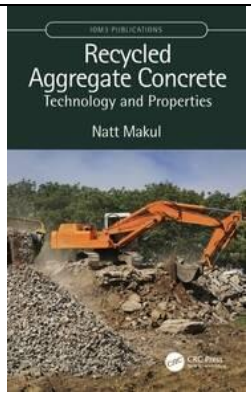
	Applications of bagasse ash in innovative modern concrete
	Advances in Self-Consolidating Concrete Incorporating Byproducts (Materials Science and Technologies)
	New Research in Microwave Processing of Concrete (Energy Science, Engineering and Technology)

	Innovative cement and concrete in modern construction
	Principles of Cement and Concrete Composites
	High-Performance Calcium-Carbonate Concrete

	Handbook of Sustainable Concrete and Industrial Waste Management: Recycled and Artificial Aggregate, Innovative Eco-friendly Binders, and Life Cycle Assessment
	Emerging Trends in Engineering Research and Technology Vol. 10 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Recent Developments in Engineering Research Vol. 6 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Recent Advances in Science and Technology Research Vol. 7 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.

	New Ideas Concerning Science and Technology Vol. 4 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Advanced Aspects of Engineering Research Vol. 5 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Advanced Aspects of Engineering Research Vol. 14 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	New Approaches in Engineering Research Vol. 4 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Novel Perspectives of Engineering Research Vol. 1 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.

	Novel Perspectives of Engineering Research Vol. 8 Dr. Natt Makul, (Editor) Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Technological Innovation in Engineering Research Vol. 2 Dr. Natt Makul Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Technological Innovation in Engineering Research Vol. 6 Dr. Natt Makul Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Current Overview on Science and Technology Research Vol. 6 Dr. Natt Makul Associate Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.
	Research and Developments in Engineering Research Vol. 1 Dr. Natt Makul Assistant Professor, Building Technology, Faculty of Industrial Technology, Phranakhon Rajabhat University, Thailand.

	Recycled Aggregate Concrete Technology and Properties By Natt Makul

7. Patents/Patty patents

เลขที่คำขอ	เลขที่ประกาศโฆษณา	เลขที่จดทะเบียน	ชื่อผู้ขอ	ชื่อสิ่งประดิษฐ์	ประเภท
0901005260	153578	64233	นายณัฏฐ์ มากล	กรรมวิธีปรับปรุงเถ้าแกลบจากโรงงานผลิตกระแสไฟฟ้าที่ใช้แกลบเป็นเชื้อเพลิงให้มีความสามารถในการทำปฏิกิริยาร่วมกับปูนซีเมนต์ปอร์ตแลนด์โดยใช้พลังงานไมโครเวฟร่วมกับระบบส่งถ่ายกำลังไมโครเวฟแบบมัลติโหมด	สิทธิบัตรการประดิษฐ์ (Patents)

ชื่อผู้ประดิษฐ์	ชื่อการประดิษฐ์	เลขที่คำขอ	วันที่ยื่นคำขอ	วันที่สร้างรายการ	เลขที่ประกาศ
นายณัฏฐ์ มากุล, นายกฤษดา เสือเอี่ยม	กรรมวิธีการผลิตคอนกรีตชนิดอัดแน่นตัวได้เองผสมเถ้าชานอ้อยจากโรงไฟฟ้าพลังงานความร้อน	1503000385	24-03-2015	24-03-2015	10358
นายณัฏฐ์ มากุล, นายกฤษดา เสือเอี่ยม	กรรมวิธีการผลิตคอนกรีตชนิดอัดแน่นตัวได้เองผสมผงอะลูมิน่า	1503000386	24-03-2015	24-03-2015	10359
นายณัฏฐ์ มากุล, นายกฤษดา เสือเอี่ยม	กรรมวิธีการผลิตคอนกรีตชนิดอัดแน่นตัวได้เองผสมเถ้าแกลบจากโรงไฟฟ้าพลังงานความร้อน	1503000384	24-03-2015	24-03-2015	10357
นายณัฏฐ์ มากุล	เครื่องฉีดฟองอากาศสำหรับใช้ผลิตคอนกรีตมวลเบาชนิดเซลลูล่า	1503000457	30-03-2015	30-03-2015	11263
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดใช้กับห้องเย็น	1603000662	22-04-2016	22-04-2016	12663
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตจีโอโพลิเมอร์เถ้าลอยด้วยพลังงานไมโครเวฟ	1603000669	22-04-2016	22-04-2016	14231
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเข็มเจาะขนาดใหญ่ผสมเถ้าลอยปริมาณสูง	1603002647	28-12-2016	28-12-2016	14499
นางดุษณี ศุภวรรธนะกุล,นางละอองทิพย์ มัทธุรศ,นายณัฏฐ์ มากุล	ชุดกะลามะพร้าวนวดเท้า	1203000859	17-08-2012	17-08-2012	8221
นายณัฏฐ์ มากุล	ชุดทดสอบและกรรมวิธีการทดสอบสารเจือปนในเถ้าลอยที่ทำให้สีของคอนกรีตเปลี่ยนไป	1103001280	29-11-2011	29-11-2011	8271

ชื่อผู้ประดิษฐ์	ชื่อการประดิษฐ์	เลขที่คำขอ	วันที่ยื่นคำขอ	วันที่สร้างรายการ	เลขที่ประกาศ
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตมอร์ต้าร์ผสมเสร็จ	1603001718	09-09-2016	09-09-2016	13050
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเทรองพื้นในทะเล	1603001721	09-09-2016	09-09-2016	13499
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตมอร์ต้าร์ผสมเสร็จชนิดแทรกตัวได้	1603001723	09-09-2016	09-09-2016	13051
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเส้นใยพลาสติกสังเคราะห์	1603001716	09-09-2016	09-09-2016	14255
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดอัดแน่นได้ด้วยตัวเองผสมเถ้าแกลบและผงหินปูน	1603001717	09-09-2016	09-09-2016	14384
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเข็มเจาะขนาดใหญ่ในทะเล	1603001719	09-09-2016	09-09-2016	14385
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเททับหน้า	1603001722	09-09-2016	09-09-2016	14386
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเทรองพื้นต้านซัลเฟต	1603001725	09-09-2016	09-09-2016	14387
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานคอนกรีตทนซัลเฟตและกันซึมน้ำ	1603001335	01-08-2016	01-08-2016	14230
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานปั๊มกันซึมน้ำ	1603001340	01-08-2016	01-08-2016	14252
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานปั๊ม	1603001341	01-08-2016	01-08-2016	14253
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จสำหรับผนังกันดิน	1603001344	01-08-2016	01-08-2016	14254
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตมอร์ต้าร์ผสมเสร็จชนิดแทรกตัวได้ผสมแร่หินแอนดิไซด์บด	1603002638	28-12-2016	28-12-2016	14388
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จผสมน้ำล้างโม่ที่เหลือจากการผสมคอนกรีต	1603000664	22-04-2016	22-04-2016	14232
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตมวลเบาชนิดเซลลูล่าผสมเส้นใยมะพร้าว	1603000073	18-01-2016	18-01-2016	14229

ชื่อผู้ประดิษฐ์	ชื่อการประดิษฐ์	เลขที่คำขอ	วันที่ยื่นคำขอ	วันที่สร้างรายการ	เลขที่ประกาศ
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตซีเมนต์ปูนฉาบฉนวนกันความร้อน	1603000640	19-04-2016	19-04-2016	12541
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จผสมเถ้าลอยและน้ำล้างโม่ที่เหลือจากการผสมคอนกรีต	1603000663	22-04-2016	22-04-2016	12664
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตมวลเบาผสมแร่หินแอนดิไซต์บด	1603000667	22-04-2016	22-04-2016	13500
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเข็มเจาะขนาดใหญ่	1603000671	22-04-2016	22-04-2016	12704
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จผสมหินแอนดิไซต์	1603000668	22-04-2016	22-04-2016	15337
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดทนทานต่อน้ำทะเล	1603000670	22-04-2016	22-04-2016	14742
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จผสมฝุ่นทรายไส้แบบหล่อด้านนอก	1603000666	22-04-2016	22-04-2016	15336
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดอัดแน่นได้ตัวเองผสมเถ้าแกลบและเถ้าลอย	1603001715	09-09-2016	09-09-2016	14932
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเข็มเจาะขนาดเล็กชนิดทนซัลเฟต	1603001720	09-09-2016	09-09-2016	14931
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเททับหน้ากันซึม	1603001724	09-09-2016	09-09-2016	14930
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานคอนกรีตทนซัลเฟต	1603001336	01-08-2016	01-08-2016	15737
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานคอนกรีตเสริมลวดอัดแรงและกันซึม	1603001337	01-08-2016	01-08-2016	15736
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดงานคอนกรีตเสริมลวดอัดแรง	1603001343	01-08-2016	01-08-2016	14743
นายณัฏฐ์ มากุล	สูตรคอนกรีตมวลเบาชนิดเซลลูล่าผสมเศษจอโทรทัศน์บด	1703001645	30-08-2017	30-08-2017	15991
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตชนิดรีแอคทีฟและผลิตภัณฑ์ที่ได้จากกรรมวิธี	1703001653	30-08-2017	30-08-2017	15990

ชื่อผู้ประดิษฐ์	ชื่อการประดิษฐ์	เลขที่คำขอ	วันที่ยื่นคำขอ	วันที่สร้างรายการ	เลขที่ประกาศ
	ดังกล่าว				
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จที่มีส่วนผสมของเถ้าลอยและผงหินปูน	1603000642	19-04-2016	19-04-2016	13370
นายณัฏฐ์ มากุล, นายกฤษดา เสือเอี่ยม	กรรมวิธีการผลิตคอนกรีตชนิดอัดแน่นตัวได้เองผสมเถ้าชานอ้อยจากโรงไฟฟ้า พลังงานความร้อนและผงหินปูน	1503001436	09-09-2015	09-09-2015	12705
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จ	1603000070	18-01-2016	18-01-2016	12160
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตมวลเบาชนิดเซลลูล่าผสมเส้นใยปาล์ม	1603000071	18-01-2016	18-01-2016	12161
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตเพสต์ซีเมนต์กำลังสูงโดยใช้พลังงานไมโครเวฟร่วมกับระบบสุญญากาศ	1603000072	18-01-2016	18-01-2016	12041
นายณัฏฐ์ มากุล	กรรมวิธีการผลิตคอนกรีตผสมเสร็จชนิดเข็มเจาะขนาดเล็ก	1603001342	01-08-2016	01-08-2016	14383

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Sum of Times Cited by Patents

For all time

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H-index

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Sum of Times Cited

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Total Publications

71
Web of Science Core Collection Publications

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Sum of Times Cited by Patents