

## รองศาสตราจารย์ ดร. นิสานาท ไตรผล

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### Education:

B.S. Materials Science, Chulalongkorn University, Bangkok, Thailand, 1996

M.S. Ceramic Engineering, Clemson University, Clemson, SC, USA, 1999

Ph.D. Ceramic Engineering, Missouri University of Science and Technology (Formerly the University of Missouri-Rolla), Rolla, MO, USA, 2004

### Appointments:

2014-present: Associate Professor, Department of Materials Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

2007-2014: Assistant Professor, Department of Materials Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

September to October 2007: Visiting researcher at Department of Nanochemistry, Tokyo Polytechnic University, Atsugi, Japan (with Professor Yutaka Sawada)

2004-2007: Lecturer, Department of Materials Science, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

2003-2004: Research assistant, Department of Ceramic Engineering, University of Missouri-Rolla, Rolla, MO, USA.

2002-2003: Teaching assistant, Department of Ceramic Engineering, University of Missouri-Rolla, Rolla, MO, USA.

### Research Interests:

- Chromatic sensing of polydiacetylene-based materials and nanocomposites
- Inorganic/organic hybrid films
- Controlling dispersion of colloids and nanoparticles in various media
- Nanocoating and dewetting behavior of polymeric and nanocomposite thin films

#### Awards:

1. Recipient of Science and Technology Scholarship, Royal Thai Government, 1997-2003.
2. 3<sup>rd</sup> prize poster award, N. Navapan, R.W. Schwartz, D. Stutts and J. Wood, "Moire Interferometric Determination and Modeling of the Local Deformation Response of Thunder Actuators," 2003 Sigma Xi Winter Graduation Jubilee Scientific and Engineering Poster Competition, May 14, 2004, University of Missouri-Rolla, Rolla, MO, USA.
3. Best poster award, R. Suntako, N. Navapan-Traiphol and P. Laoratanakul, "Effects of an Anionic Polyelectrolyte on Stability of Lead Zirconate Titanate Aqueous Suspension," The Forth Thailand Materials Science and Technology Conference (MS@T IV), March 31-April 1, 2006, Thailand Science Park Convention Center, Pathumtani, Thailand.
4. Exchange visiting scholarship, Commission on Higher Education: To conduct research at Department of Nanochemistry, Faculty of Engineering, Tokyo Polytechnic University, Atsugi, Japan, September 1<sup>st</sup>-October 5<sup>th</sup>, 2007.
5. รางวัลเสนอผลงานวิจัยดีเยี่ยมแบบโปสเตอร์ การประชุมนักวิจัยรุ่นใหม่..พบ..เมธีวิจัยอาวุโส สกว. 15-17 ต.ค. 2552 เพชรบุรี (Best poster award, The Thailand Research Fund Annual Meeting 2009)
6. ทุนช่วยเหลือทางด้านวิจัยวิทยาศาสตร์และเทคโนโลยี ครั้งที่ 18 ประจำปีพ.ศ. 2554 มูลนิธิโทรเพื่อการส่งเสริมวิทยาศาสตร์ ประเทศไทย (Thailand Toray Science Foundation 2011)
7. รางวัลจตุรมงกุฎ: เกียรติภูมิวิทยา "ยกย่องเชิดชูเกียรตินักวิจัยรุ่นกลางดีเด่น กองทุนเพื่อการวิจัย คณะวิทยาศาสตร์ ประจำปี 2556 (สาขาเทคโนโลยี) (Best Mid-career Researcher Award, Faculty of Science, Chulalongkorn University 2013)
8. รางวัลสภาวิจัยแห่งชาติ: รางวัลผลงานวิจัย ประจำปีงบประมาณ 2562 (Research work award: National Research Council of Thailand (NRCT) 2019)

#### Plenary, Keynote and Invited Oral Presentations:

1. Colorimetric sensing of temperature and chemicals by PDA-based nanocomposite (Invited speaker), TMU and PetroMat Joint Mini Symposium on Catalysis and Advanced Materials 2017, February 1, 2017, Bangkok, Thailand.
2. Polydiacetylene/Zinc Oxide Nanocomposite As Thermal And Chemical Sensors (Plenary speaker), International Conference on Advances in Science and Engineering (ICASE 2017), January 20-22, 2017, Bangkok, Thailand
3. Thermal and Chemical Sensors Based On Polydiacetylene/Zinc Oxide Nanocomposite (Keynote speaker), The 3rd International Congress on Advanced Materials (AM 2016) November 27-30, 2016, Bangkok, Thailand
4. Polydiacetylene-Based Nanocomposite as Colorimetric Sensors (Keynote speaker), The International Polymer Conference of Thailand (PCT-6), June 30-July 1, 2016, Bangkok, Thailand.

5. Colorimetric Sensor Based on Polydiacetylene/Zinc Oxide Nanocomposite for Various Organic Acids and Bases (Invited speaker), The 1<sup>st</sup> CU-TMU Symposium in Advanced Chemistry and Materials, PACCON 2016, February 9-11, 2016, Bangkok, Thailand
6. Controlling the colorimetric response of polydiacetylene/zinc oxide nanocomposite for sensing applications (Invited speaker), The Global Human Resource Program Bridging across Physics and Chemistry, January 29, 2016, Tokyo Metropolitan University, Japan
7. Colorimetric Sensor based on Polydiacetylene/Zinc Oxide Nanocomposites (Invited speaker), Current Advancement in Materials Technology & The Energy Conversion Forum 2016, January 11-12, 2016, Chulalongkorn University
8. Polydiacetylene/Zinc Oxide Nanocomposite for Sensing Applications (Invited speaker), the meeting on further academic collaboration between Chulalongkorn University and Nagaoka University of Technology, March 18-25, 2015, Nagaoka University, Japan
9. Color Stability and Thermochromism of Polydiacetylene/Zinc Oxide Nanocomposite in Various Organic Solvents and Polymer Matrices (Invited speaker), 2014 Collaborative Conference on Materials Research (CCMR), June 23-27, 2014, Inchoen, South Korea.
10. Development of Polydiacetylene/ZnO Nanocomposites for Sensing Applications (Invited speaker), International Symposium in Science and Technology at Kansai University 2013, August 21-23, 2013, Kansai University, Japan.

**Journal Publications: (\*=corresponding author)**

1. Phonchai, N., Khanantong, C., Kielar, F., Traiphol, R., Traiphol, N.\* "Low-Temperature Reversible Thermochromic Polydiacetylene/Zinc(II)/Zinc Oxide Nanocomposites for Colorimetric Sensing" *ACS Applied Nano Materials*, 2 (7) (2019), pp. 4489-4498.
2. Seetha, S., Saymung, R., Traiphol, R., Traiphol, N.\* "Controlling self-assembling and color-transition of polydiacetylene/zinc(II) ion/zinc oxide nanocomposites by varying pH: Effects of surface charge and head group dissociation" *Journal of Industrial and Engineering Chemistry*, 72 (2019), pp. 423-431. (IF = 4.841)
3. Khanantong, C., Charoenthai, N., Kielar, F., Traiphol, N., Traiphol, R. "Influences of bulky aromatic head group on morphology, structure and color-transition behaviors of polydiacetylene assemblies upon exposure to thermal and chemical stimuli" *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 561 (2019), pp. 226-235. (IF = 2.829)
4. Potai, R., Faisadcha, K., Traiphol, R., Traiphol, N.\* "Controllable thermochromic and phase transition behaviors of polydiacetylene/zinc(II) ion/zinc oxide nanocomposites via photopolymerization: An insight into the molecular level" *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 555 (2018), pp. 27-36. (IF = 2.829)

5. Khanantong, C., Charoenthai, N., Phuangkaew, T., Kielar, F., Traiphol, N., Traiphol, R., "Phase transition, structure and color-transition behaviors of monocarboxylic diacetylene and polydiacetylene assemblies: The opposite effects of alkyl chain length" *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 553 (2018), pp. 337–348. (IF = 2.829)
6. Khanantong, C., Charoenthai, N., Wacharasindhu, S., Sukwattanasinitt, M., Traiphol, N., Traiphol, R. "Influences of solvent media on chain organization and thermochromic behaviors of polydiacetylene assemblies prepared from monomer with symmetric alkyl tails" *Journal of Industrial and Engineering Chemistry*, 58 (2018), pp. 258-265. (IF = 4.841)
7. Kamphan, A., Khanantong, C., Traiphol, N., Traiphol, R., "Structural-thermochromic relationship of polydiacetylene (PDA)/polyvinylpyrrolidone (PVP) nanocomposites: Effects of PDA side chain length and PVP molecular weight," *Journal of Industrial and Engineering Chemistry*, 46 (2017), pp. 130-138. (IF = 4.841)
8. Traiphol, N.\*, Chanakul, A., Kamphan, A., Traiphol, R., "Role of Zn<sup>2+</sup> ion on the formation of reversible thermochromic polydiacetylene/zinc oxide nanocomposites," *Thin Solid Films*, 622, (2017), pp. 122-129. (IF=1.939)
9. Chanakul, A., Traiphol, R., Traiphol, N.\*, "Utilization of polydiacetylene/zinc oxide nanocomposites to detect and differentiate organic bases in various media," *Journal of Industrial and Engineering Chemistry*, 45, (2017), pp. 215-222. (IF = 4.841)
10. Kamphan, A., Traiphol, N., Traiphol, R., "Versatile route to prepare reversible thermochromic polydiacetylene nanocomposite using low molecular weight poly(vinylpyrrolidone)," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 497, (2016), pp. 370-377. (IF = 2.829)
11. Chanakul, A., Traiphol, R., Traiphol, N.\*, "Colorimetric sensing of various organic acids by using polydiacetylene/zinc oxide nanocomposites: Effects of polydiacetylene and acid structures," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 489, (2016), pp. 9-18. (IF = 2.829)
12. Pangpaiboon, N., Traiphol, R., Traiphol, N.\*, "Enhancing the stability of polystyrene ultrathin films by using star-shape polymers as dewetting inhibitors," *J. Coat. Technol. Res.*, 12 (6), (2015), pp. 1173-1183 (IF = 1.619)
13. Toommee, S., Traiphol, R., Traiphol, N.\*, "High color stability and reversible thermochromism of polydiacetylene/zinc oxide nanocomposite in various organic solvents and polymer matrices," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 468 (2015), pp. 252-261. (IF = 2.829)
14. Traiphol, N.\*, Faisadcha, K., Potai, R., Traiphol, R., "Fine tuning the color-transition temperature of thermoreversible polydiacetylene/zinc oxide nanocomposites: The effect of

- photopolymerization time," *Journal of Colloid and Interface Science*, 439 (2015), pp. 105-111. (IF = 5.091)
15. Pangpaiboon, N., Traiphol, N.\*, "Dewetting Suppression of Polystyrene Thin Film using Titanium Dioxide Nanoparticles," *Key Engineering Materials*, 608 (2014) pp. 218-223.
  16. Chanakul, A., Traiphol, N.\*, Faisadcha, K., Traiphol, R\*, Dual colorimetric response of polydiacetylene/ZnO nanocomposites to low and high pH," *Journal of Colloid and Interface Science*, 418 (3) (2014), pp. 43-51. (IF = 5.091)
  17. Pangpaiboon, N., Traiphol, N.\*, Promarak, V., Traiphol, R.\*; "Retardation the dewetting dynamics of ultrathin polystyrene films using highly branched aromatic molecules as additives," *Thin solid Films*, 548, (2013), pp. 323-330. (IF=1.939)
  18. Traiphol, N.\*, Toommee, S., Rutnakornpituk, M., Traiphol, R., Jinawath, S., "Improvement of dispersion and stability of fine titanium dioxides in silicone fluid using poly(ethylene oxide-b-dimethylsiloxane-b-ethylene oxide) triblock copolymer: Effects of dispersant structure and concentration," *Journal of Ceramic Processing Research*, 14 (3) (2013), pp. 315-321. (IF =0.327)
  19. Toommee, S., Traiphol, N.\*, "Enhancement on stability of nano-sized titanium dioxide in silicone suspension using diblock copolymer: Influence of dispersant structure," *Advanced materials research*, 747 (2013), pp. 599-602.
  20. Suntako, R., Traiphol, N.\*, "Control over dispersion efficiency of nano-size ZnO particles in aqueous medium: Correlation between dispersant molecular weight and particle size," *Advanced materials research*, 664 (2013), pp. 654-660.
  21. Chanakul, A., Traiphol, N.\*, Traiphol, R\*, "Controlling the reversible thermochromism of polydiacetylene/zinc oxide nanocomposites by varying alkyl chain length," *Journal of Colloid and Interface Science* 389 (1) (2013), pp. 106-114. (IF = 5.091)
  22. Sangjan, S., Traiphol, N.\*, Traiphol, R.\*, "Influences of Poly[(styrene)x-stat-(chloromethylstyrene)y]s Additives on Dewetting Behaviors of Polystyrene Thin Films: Effects of Polar Group Ratio and Film Thickness," *Thin Solid Films* 520 (15) (2012), pp. 4921-4928. (IF=1.939)
  23. Hirunprateep, T., Traiphol, N.\*, Potai, R., Traiphol, R.\*, "Improvement of dispersion state and charge separation efficiency of hybrid films of ZnO nanoparticle/conjugated polymers by utilizing methanol as a volatile dispersant," *Synthetic Metals* 162 (1-2) (2012), pp. 44-48. (IF =2.526)
  24. Traiphol, N.\*, Rungruangviriyaya, N., Potai, R., Traiphol, R.\*, "Stable polydiacetylene/ZnO nanocomposites with two-steps reversible and irreversible thermochromism: The influence of strong surface anchoring," *Journal of Colloid and Interface Science* 356 (2) (2011), pp. 481-489. (IF = 5.091)

25. Rungruangviriyaya, N., Traiphol, N.\*, "Versatile Route for Preparation of Polydiacetylene/ZnO Nanocomposites and Their Colorimetric Response to pH and Ethanol," *Journal of Metals, Materials and Minerals* 20(2) (2010), pp. 35-41.
26. Traiphol, N.\*, Suntako, R., Chanthornthip, K., "Roles of Polymeric Dispersant Charge Density on Lead Zirconate Titanate Aqueous Processing," *Ceramics International* 36 (7) (2010), pp. 2147-2153. (IF=3.057)
27. Sangjan, S., Traiphol, N.\*, Traiphol, R.\*, "Improvement of ultrathin polystyrene film stability by addition of poly(styrene-*stat*-chloromethylstyrene) copolymer: An Atomic Force Microscopy study," *Thin Solid Films* 518 (17) (2010), pp. 4879-4883. (IF=1.939)
28. Suntako, R., Laoratanakul, P., Traiphol, N.\*, "Effects of dispersant concentration and pH on properties of lead zirconate titanate aqueous suspension," *Ceramics International* 35 (3) (2009), pp. 1227-1233. (IF=3.057)
29. Kondo, T., Aoki, T., Traiphol, N., Seki, Y., Enta, H., Seki, S., Wang, M., Uchida, T., Ozao, R., Sawada, Y.\*, "Greener Spray CVD Process with Water Solution to Fabricate Transparent IR-Shielding Films on Glass Windows," *Transaction of Materials Research Society of Japan* 33(4) (2008), pp. 1355-1357.
30. Pangpaiboon, N., Bunjongpru, W., Treetavesak, O., Nukaew, J., Traiphol, N.\*, "Properties of aluminum oxynitride (AlON) thin film grown by reactive RF magnetron sputtering," *KKU Research Journal* 13(6) (2008) 755-758.
31. Toommee, S., Traiphol, N.\*, Rutnakornpituk, M., Traiphol, R., "Dispersion of titanium dioxide nanoparticles in silicone oils using poly(ethylene glycol-B-dimethylsiloxane-B- ethylene glycol) triblock copolymer as dispersants," *KKU Research Journal* 13(6) (2008) 750-754.
32. Traiphol, N.\*, "Effects of ball milling time and dispersant concentration on properties of a lead zirconate titanate aqueous suspension for tape casting," *Journal of Ceramic Processing Research* 8(2) (2007), pp. 137-141. (IF =0.327)
33. Navapan-Traiphol, N., Schwartz, R.W., Stutts, D., Wood, J., "Characterization and modeling of local electromechanical response in stress-biased piezoelectric actuators," *IEEE International Symposium on Applications of Ferroelectrics* (2005), pp. 56-59.

**Book Chapter:**

1. Narayanan, M., Schwartz, R.W., Navapan-Traiphol, N., Stress engineered piezoelectric composites (Chapter B), *Piezoelectric Materials: Structure, Properties and Applications* 2010, Pages 37-77 ISBN: 978-160876272-9 Publisher: Nova Science Publishers, Inc.

**Articles:**

1. Traiphol, N.\*, Rainbow and Thunder (in thai), Ceramics Journal, September-December, pp. 34-39 (2007).
2. Traiphol, N.\*, Role of nanoparticles in environmental-friendly paint (in thai), Ceramics Journal, May-August (2009).

**Proceedings:**

1. Seetha, S., Traiphol, N., "Effects of Cationic Surfactants on Dispersing Stability and Color Transition of Polydiacetylene/Zinc Oxide Nanocomposite in Toluene," Proceedings of The International Polymer Conference of Thailand (PCT-6) in June 30-July 1, 2016, Bangkok, Thailand.
2. Pengoubol, S., Traiphol, N., "Thermochromism of Polydiacetylene/Zinc Oxide Nanocomposites with Various Zinc Oxide Concentrations," Proceedings of The 4<sup>th</sup> Polymer Conference of Thailand (PCT-4), March 20-21, 2014, Bangkok, Thailand.
3. Faisadcha, K., Traiphol, N.\*, Traiphol, R., "The colorimetric response to ph of polydiacetylene/zno nanocomposites," Proceedings of 38<sup>th</sup> Congress on Science and Technology of Thailand, October 17-19, 2012, Chiangmai, Thailand.
4. Chanthornthip, K., Traiphol, N.\*, Srihirin, T., Traiphol, T., "Enhancement of Photovoltaic Properties and Dispersion State of TiO<sub>2</sub> Nanoparticles/MEH-PPV Hybrid Films using Mixed-solvent Systems," Proceedings of 37<sup>th</sup> Congress on Science and Technology of Thailand, October 10-12, 2011, Bangkok.
5. Hirunprateep, T., Traiphol, N.\*, Traiphol, R., "Influences of Mixed Solvents on Dispersion State and Photophysical Properties of ZnO Nanoparticle/Conjugated Polymer Hybrid Films," Proceedings of International Symposium on Material Science Engineering and Energy Technology June 30<sup>th</sup> – July 1<sup>st</sup> 2011, Pathumthani, Thailand
6. Sangjan, S., Traiphol, N.\*, Traiphol, R., "Suppression the Dewetting Dynamics of Polymeric Thin Film by Addition of Fe<sub>3</sub>O<sub>4</sub> Nanoparticles," Proceedings of The Pure and Applied Chemistry International Conference 2011 (PACCON 2011), 5-7 January 2011, Bangkok, Thailand.
7. Traiphol, N.\*, Orn-in, A., Srihirin, T., Pratontep, S., Traiphol, R., "Effects of Solvents and Fabrication on Morphology and Optical Property of TiO<sub>2</sub>/MEH-PPV Thin Film," Proceedings of the 27<sup>th</sup> MST Annual Conference, 20-22 January 2010, Samui, Surat Thani, Thailand.
8. Rungruangviriyaya, N., Traiphol, N.\*, Traiphol, R., "Preparation and Optical Properties of Polydiacetylene Vesicles with Metal Oxide Nanoparticle Core," Proceedings of the 27<sup>th</sup> MST Annual Conference, 20-22 January 2010, Samui, Surat Thani, Thailand.
9. Pangpaiboon, N., Traiphol, N.\*, Promarak, V., Traiphol, R., "Influence of Dendrimer Additives on the Stability of Thin Polystyrene Films," Proceedings of the 27<sup>th</sup> MST Annual Conference, 20-22 January 2010, Samui, Surat Thani, Thailand.

10. Traiphol, R.\*, Osotchan, T., Traiphol, N., Uchida, T., Sawada, Y., "Effects of solvent on properties of polymer light emitting device based on MEH-PPV: Roles of thin film fabrication," Proceedings of the 27<sup>th</sup> MST Annual Conference, 20-22 January 2010, Samui, Surat Thani, Thailand.
11. Orn-in, A., Traiphol, N.\*, Srihirin, T., Traiphol, R., "Roles of Fabrication Process on Morphology and Optical Property of Conducting Polymer MEH-PPV," 2<sup>nd</sup> polymer graduate conference of Thailand, 21-22 May 2009, Faculty of Science, Chulalongkorn U.
12. Traiphol, N.\*, Sangjan S., Traiphol, R., "Suppression the Dewetting Polystyrene Thin Films by Blending with Poly(styrene-*stat*-chloromethyl styrene): The AFM Study," Proceedings of the 26th Annual Conference of the Microscopy Society of Thailand, January 28-30, 2009, Chiangmai, Thailand.
13. Chanthornthip, K., Singtothong, R., Traiphol, N.\*, "Aqueous Processing of Lead Zirconate Titanate Suspension using Polyelectrolyte Dispersants," Proceedings of The 15<sup>th</sup> Academic conference, the 2007 Annual Meeting, Steps Towards the 10<sup>th</sup> Decade of the Faculty of Science, Chulalongkorn University, March 15-16, 2007, Faculty of Science, Chulalongkorn University, Bangkok, Thailand.
14. Traiphol, N.\*, Suntako, R., Laoratanakul, P., "Effects of an Anionic Polyelectrolyte on Stability of Lead Zirconate Titanate Aqueous Suspension," Proceedings of the Forth Thailand Materials Science and Technology Conference (MS@T IV), March 31-April 1, 2006, Thailand Science Park Convention Center, Pathumtani, Thailand.
15. Navapan-Traiphol, N., Schwartz, R.W., Stutts, D., Wood, J., "Depth profiling of electromechanical response and modeling of local deformation of thunder actuators," Proceedings of the International Conference on Smart Materials (SmartMat-'04), Dec.1-3, 2004, Chiangmai, Thailand.