

## Biographical Sketch

Y. Charles Cao

Department of Chemistry, University of Florida, Gainesville, FL 32611.  
Email:cao@chem.ufl.edu; Phone: 352-392-9839; Fax: 352-392-0588

### Education and Training:

B.S. Chemistry, Jilin University, China, 1990  
M.S. Chemistry, Jilin University, China, 1993  
Ph.D. Chemistry, Jilin University, China, 1996  
Postdoctoral Fellow, Institute of Photographic Chemistry, Beijing (1996-1998)  
Postdoctoral Fellow, Hebrew University, Israel (1998-2000)  
Postdoctoral Fellow, Northwestern University (2000-2003)

### Research and Professional Experience:

2009- current Associate Professor of Chemistry, University of Florida  
2003-2009 Assistant Professor of Chemistry, University of Florida

### Publications:

- (1) Wang, T.; Wang, X.; LaMontagne, D.; Wang, Z.W.; and **Cao, Y.C.** "Macroscale Lateral Alignment of Semiconductor Nanorods into Freestanding Thin Films." *J. Am. Chem. Soc.* **2013**, *135*, 6022-6025.
- (2) Wang, T.; LaMontagne, D.; Lynch, J.; Zhuang, J.; and **Cao, Y.C.** "Colloidal Superparticles from Nanoparticle Assembly." *Chem. Soc. Rev.* **2013**, *42*, 2804-2823.
- (3) Wang, T.; Wang, X.; LaMontagne, D.; Wang, Z.L.; Wang, Z.W.; and **Cao, Y.C.** "Shape-controlled Synthesis of Colloidal Superparticles from Nanocubes." *J. Am. Chem. Soc.* **2012**, *134*, 2868-2871.
- (4) Wang, T.; Zhuang, J.; Lynch, J. J.; Chen, O.; Wang, Z.L.; Wang, X.; LaMontagne, D.; Wu, H.; Wang, Z.W.; **Cao, Y.C.** "Self-Assembled Colloidal Superparticles from Nanorods." *Science* **2012**, *338*, 358-363.
- (5) Wang, Z.L.; Liu, H.; Yang, S. H.; Wang, T.; Liu, C.; **Cao, Y. C.** "Nanoparticle-based Artificial RNA Silencing Machinery for Antiviral Therapy." *Proceedings of the National Academy of Sciences*, **2012**, *109*, 12387-12392.
- (6) Nagaoka, Y.; Chen, O.; Wang, Z.; **Cao, Y.C.** "Structural Control of Nanocrystal Superlattices Using Organic Guest Molecules." *J. Am. Chem. Soc.* **2012**, *134*, 2868-2871.
- (7) Nagaoka, Y.; Wang, T.; Lynch, J.; LaMontagne, D.; **Cao, Y.C.** "Binary Assembly of Colloidal Semiconductor Nanorods with Spherical Metal Nanoparticles," *Small* **2012**, *8*, 843-846.
- (8) Chen, O.; Yang, Y. A.; Wu, H.; Wang, T., Yang, J., **Cao, Y.C.** "Surface-Dependent Optical Properties of II-VI Semiconductor Nanocrystals." *J. Am. Chem. Soc.* **2011**, *133*, 17504-17512.

- (9) Wang, Z.; Schliehe, C.; Wang, T.; Nagaoka, Y.; **Cao, Y.C.**; Bassett, W. A.; Wu, H.; Fan, H.; and Weller, H. "Deviatoric Stress Driven Formation of Large Single-Crystal PbS Nanosheet from Nanoparticles and *in Situ* Monitoring of Oriented Attachment," *J. Am. Chem. Soc.* **2011**, *133*, 14484-14487.
- (10) Wu, H.; Chen, O.; Zhuang, J.; Lynch, J.; LaMontagne, D.; Nagaoka, Y.; **Cao, Y.C.** "Formation of Heterodimer Nanocrystals: UO<sub>2</sub>/In<sub>2</sub>O<sub>3</sub> and FePt/In<sub>2</sub>O<sub>3</sub>," *J. Am. Chem. Soc.* **2011**, *133*, 14327-14337.
- (11) Lynch, J.; Zhuang, J.; Wang, T.; LaMontagne, D.; Wu, H.; **Cao, Y.C.** "Gas-Bubble Effects on the Formation of Colloidal Iron Oxide Nanocrystals," *J. Am. Chem. Soc.* **2011**, *133*, 12664-12674.
- (12) Chen, O.; Shelby, D. E.; Yang, Y. A.; Zhuang, J.; Wang, T.; Niu, C.; Omenetto, N.; **Cao, Y.C.** "Excitation-Intensity-Dependent Color-Tunable Dual Emissions from Manganese-Doped CdS/ZnS Core/Shell Nanocrystals," *Angew. Chem. Int. Ed.* **2010**, *49*, 10132-10135.
- (13) Wang, Z.W.; Chen, O.; **Cao, Y.C.**; Finkelstein, K.; Smilgies, D. M.; Lu, X. M.; Bassett, W. A. "Integrating *in situ* high pressure small and wide angle synchrotron x-ray scattering for exploiting new physics of nanoparticle supercrystals." *Rev. Sci. Instrum.* **2010**, *81*, 093902.
- (14) Chen, O.; Zhuang, J.; Guzzetta, F.; Lynch, J.; Angerhofer, A.; **Cao, Y.C.** "Synthesis of Water-Soluble 2,2'-Diphenyl-1-Picrylhydrazyl Nanoparticles: A New Standard for electron Paramagnetic Resonance Spectroscopy," *J. Am. Chem. Soc.* **2009**, *131*, 12542-12543.
- (15) Zhuang, J.; Shaller, A.; Lynch, J.; Wu, H.; Chen, O.; Li, A.; **Cao, Y.C.** "Cylindrical Superparticles from Semiconductor Nanorods." *J. Am. Chem. Soc.* **2009**, *131*, 084-6085.
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- (17) Chen, O.; Chen, X.; Yang, Y.; Lynch, J.; Wu, H.; Zhuang, J.; **Cao, Y.C.** "Synthesis of metal-selenide nanocrystals using SeO<sub>2</sub> as the selenium precursor." *Angew. Chem. Int. Ed.* **2008**, *47*, 8638.
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- (19) Wu, H.; Zhu, H.; Zhuang, J.; Yang, S.; Liu, C.; **Cao, Y. C.** "Water-soluble nanocrystals through dual-interaction ligands." *Angew. Chem. Int. Ed.* **2008**, *47*, 3730-3734.
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- (21) Zhuang, J.; Wu, H.; Yang, Y.; **Cao, Y.C.** "Supercrystalline colloidal particles from artificial atoms." *J. Am. Chem. Soc.* **2007**, *129*, 14166-14167.
- (22) Wu, H.; Yang, Y.; **Cao, Y.C.** "Synthesis of colloidal uranium-dioxide nanocrystals." *J. Am. Chem. Soc.* **2006**, *128*, 16522-16523.
- (23) Yang, Y.; Chen, O.; Angerhofer, A.; **Cao, Y.C.** "Radial-position-controlled doping in CdS/ZnS core/shell nanocrystals." *J. Am. Chem. Soc.* **2006**, *128*, 12428-12429.
- (24) Jin, R.; **Cao, Y.C.**; Thaxton, C. S.; Mirkin, C. A. "Glass-bead-based parallel detection of DNA using composite Raman labels." *Small* **2006**, *2*, 375-380.

- (25) Yang, Y.; Wu, H.; Williams, K. R.; **Cao, Y.C.** "Synthesis of CdSe and CdTe nanocrystals without precursor injection." *Angew. Chem. Int. Ed.* **2005**, *44*, 6712-6715.
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### Funding:

Role	Agency	Grant Title & Dates	Total Award	Candidate Allocation (Amount)
PI	National Science Foundation	Colloidal Superparticles from Self-Assembly of Nanoparticles (DMR1309798), 7/1/2013-6/30/2016	\$390,000	\$390,000
PI	Office of Naval Research	SERS-based Nano-tagants (N000141310325), 01/25/2013-01/24/2016	\$734,652	\$734,652
Sub-contractor	Army Edgewood Chemical and Biological Center	Portable SERS Based DNA BWA Analyzer (W911SR-12-C-0054), 11/01/2012-10/31/2013	\$750,000	\$269,249
Co-PI	National Science Foundation	Effect of Physicochemical Properties on Nanoparticle Mobility in Unsaturated Porous Media (CHE-1213333), 10/01/2012-9/30/2015	\$340,000	\$155,000
PI	Office of Naval Research	Semiochemical-mediated Nano-Tagants (N00014-09-1-0441), 11/01/2008-03/01/2013	\$1,087,637	\$1,087,637
Sub-contractor	DARPA	"Upconverting Film," DARPA SBIR Phase II, Mesolight, LLC, 11/30/ 2009-4/30/2011	\$750,000	\$45,000
Sub-contractor	Department of Energy	"High-Efficiency and Less Expensive Nanocrystal-based Scintillator," SBIR Phase II, 1/30/ 2009-6/30/2010	\$700,000	\$70,000

Sub-contractor	Department of Energy	“High-Efficiency and Less Expensive Nanocrystal-based Scintillator.” DOE SBIR Phase 1, Mesolight, LLC, 6/20/07-3/30/08	\$100,000	\$14,200
Sub-contractor	DARPA	“Upconverting Film,” SBIR Phase I, Mesolight, LLC, 7/01/07-12/31/08	\$99,000	\$10,651
Sub-contractor	National Science Foundation	High Efficiency and Stable Nanocomposite Light-Emitting Diode” NSF SBIR Phase, Mesolight, LLC, 7/1/07-12/30/07.	\$100,000	\$24,851
Sub-contractor	National Science Foundation	Radial-position Controlled Lanthanide Doped Nanocrystals as Time-resolved Fluorescence Imaging agent, SBIR Phase I, Mesolight, LLC, 7/1/07-12/30/07.	\$100,000	\$24,851
PI	National Science Foundation	Career-Award: Position-Controlled Doping of Semiconductor Nanocrystals. (DMR0645520), 03/01/2007-02/29/2012	\$500,000	\$500,000
PI	Office of Naval Research	Mechanistic Understanding of Semiconductor Nanocrystal Synthesis (N00014-06-1-0911), 06/19/2006-06/18/2009	\$450,000	\$450,000
PI	ACS-Petroleum Research Fund	Colloidal Synthesis of High-Quality Lanthanide-Oxide Nanocrystals (PRF #42542-G10), 05/01/05-04/30/07	\$35,000	\$35,000

### **Awards and Honors:**

- (1) Outstanding Young Investigator Award-B from the National Science Foundation of China (2010)
- (2) Longjiang Scholar Professor, China (2007)
- (3) National Science Foundation Career Award (2007).
- (4) Exemplary Graduate Advisor and Mentor in the National Science Foundation AGEP Program (2004).
- (5) Collegiate Inventors Award, National Inventors Hall of Fame (2003).