

# MIHAI A. BURETEA

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## OBJECTIVE

R&D contract involving chemical synthesis or polymer, semiconductor or particle technology

## EDUCATION

Ph.D., Chemistry, University of California at Berkeley, May 2000.

Dissertation: *Conjugated Organometallic Polymers Incorporating Ferrocenyl and Germole Units in the Main Chain*, Prof. T. D. Tilley.

B.A., Chemistry, Rutgers University, May 1993.

Thesis: *Low Temperature Molecular Approaches to Nano-scale Semiconducting Materials*, Prof. J. G. Brennan.

## FACILITIES

A 1700 ft<sup>2</sup> lab equipped for organic, organometallic, polymer and inorganic synthesis.

## EXPERIENCE

March 2005

INDEPENDENT CONTRACTOR, BUSINESS OWNER

Present

*Calchemist, San Carlos, CA*

- Design and synthesis of precursors for preparation of oxide and nitride films by CVD
- Synthesis and process development of specialty silicones for optical applications
- Failure mode analysis of polymer and elastomer seals and their reformulation to withstand aggressive semiconductor processing conditions

July 2002

R&D SCIENTIST

March 2005

*Nanosys, Inc., Palo Alto, CA*

- Developed colloidal syntheses of size and shape-controlled CdSe, CdTe, InP and Pd nanocrystals used in photovoltaic, data storage and other device applications
- Developed custom ligands and ligand exchange procedures used to tailor the surface and electronic properties of nanocrystals to suit specific applications
- Synthesized and modified conductive polymers to enhance the performance of electronic and optical devices
- Worked closely with a device team investigating the mechanism of operation of nanocrystal-based photovoltaic devices
- Designed custom electronic, optical and vacuum equipment for nanocrystal synthesis automation, real-time spectroscopy and specialty applications

Oct. 2000

MANUFACTURING SCIENTIST

June 2002

*Quantum Dot Corp., Hayward, CA*

- Technical leader of process transfer from research and development to a rapidly growing production organization
- Early through late-stage process development and optimization leading to reliable procedures for the manufacture of stable, highly photo-luminescent nanoparticles
- Technology transfer between academic research partners and Quantum Dot Corp.
- Contributed significantly to research into new nanoparticle synthesis and modification methods as well as characterization methods uniquely adapted to nanoparticles

June 1994

GRADUATE RESEARCH ASSISTANT

May 2000

*University of California at Berkeley and Lawrence Berkeley National Laboratory*

- Synthesized and characterized novel conjugated polymers containing ferrocenyl and germole units in the main chain
- Developed synthetic routes to numerous highly conjugated organometallic complexes and organic ligands
- Produced new polymers exhibiting interesting properties such as photoluminescence, electrical conductivity and redox activity

June 1993  
May 1994

INTERN, RESEARCH ASSISTANT

*Exxon Research and Engineering Co., Annandale, NJ*

- Synthesized novel derivatives of the fullerenes  $C_{60}$  and  $C_{70}$  via electrophilic trapping of fulleride anions
- Investigated the kinetics of  $C_{60}$  oxidation in superacid media and developed methodology for derivatizing cationic fullerenes

### CHEMISTRY AND MATERIALS EXPERTISE

- Polymer synthesis via condensation, catalytic coupling, ROP and ROMP
- Polymer purification and film spin-casting for LED and PV device prototyping
- Synthesis and purification of conjugated organic molecules and ligands, air-sensitive organometallic and inorganic compounds
- Synthesis of CdS, CdSe, CdTe, InP, ZnS,  $CeO_2$  and Pd nanoparticles, including rod, tetrapod, sphere and core-shell structures
- Thin film deposition by evaporation, CVD, dip, blade and spin-casting
- Molecular characterization: multinuclear FT-NMR, FTIR, GCMS, HPLC, X-ray crystallography, electrochemistry, optical spectroscopy
- Materials characterization: TEM, SEM, GPC, DLS, XRD, NIR, thermal analysis, solution and film electrochemistry, photoluminescence, photodegradation, electroluminescence, AC/DC conductivity

### PATENTS AND PUBLICATIONS

- 7,228,050 "Nanocomposites"  
7,091,120 "System and process for producing nanowire composites and electronic substrates therefrom"  
7,087,833 "Nanostructure and nanocomposite based compositions and photovoltaic devices"  
7,087,832 "Nanostructure and nanocomposite based compositions and photovoltaic devices"  
7,068,898 "Nanocomposites"  
6,949,206 "Organic species that facilitate charge transfer to or from nanostructures"  
6,878,871 "Nanostructure and nanocomposite based compositions and photovoltaic devices"  
Over 20 US and international applications

"Poly(2,5-diphenylgermole): Incorporation of a Germole Ring into a Conjugated Polymer," B. L. Lucht, M. A. Buretea, T. D. Tilley, *Organometallics*, **2000**, *19*, 3469.

"Strained, Ring Tilted Dicarbon-bridged [2]Ferrocenophanes and Ferrocene Revisited:  $^{57}Fe$  Mossbauer Spectroscopic Study of Bonding, Hyperfine Interactions and Lattice Dynamics," R. H. Herber, K. Temple, I. Manners, M. Buretea, T. D. Tilley, *Inorg. Chim. Acta*, **1999**, *287*, 152.

"Poly(ferrocenylenevinylene) From Ring-Opening Metathesis Polymerization of ansa-(vinylene)Ferrocene," M. A. Buretea, T. D. Tilley, *Organometallics*, **1997**, *16*, 1507-1510.

"2,2'-Bipyridine Complexes of the Lithium Chalcogenolates  $Li(EPh)$  and  $Li(NC_5H_4E-2)$  ( $E=S$  or  $Se$ )," D. V. Khasnis, M. A. Buretea, T. J. Emge, J. G. Brennan, *J. Chem. Soc., Dalton Trans.*, **1995**, 45-48.

"Pyridine Coordination Complexes of the Divalent Ytterbium Chalcogenolates  $Yb(EPh)_2$  ( $E=S$ ,  $Se$ ,  $Te$ )," M. Brewer, D. Khasnis, M. A. Buretea, M. Berardini, T. J. Emge, J. G. Brennan, *Inorg. Chem.*, **1994**, *33*, 2743-2747.

"Formation and Characterization of Polysulfonated  $C_{60}$ ," G. P. Miller, M. A. Buretea, M. M. Bernardo, C. S. Hsu, H. L. Fang, *J. Chem. Soc., Chem. Commun.*, **1994**, 1549-1550.

### REFERENCES

Provided upon request