TIMOTHY J. BOYLE

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CAREER OBJECTIVES: A challenging research position in inorganic/organometallic chemistry with an emphasis on synthesis, characterization, and reactivity of polymetallic and hetero-polymetallic compounds as applied to the development of novel materials.

PROFESSIONAL APPOINTMENTS:

October 1994 - Present

Principal Member of Technical Staff
Department of Advanced Materials Laboratory - 1815
Advanced Materials Laboratory
Sandia National Laboratories

- National Laboratory Professor (SNL – UNM Department of Chemistry, **2015**)
- Detailee appointment at the Office of Biological and Environmental Research for Department of Energy, Headquarters Germantown Md (**2004-2005**)
- Adjunct Professor at the University of New Mexico - Chemical and Nuclear Engineering (**2004**) and School of Medicine (**2004**)
- Adjunct Professor at the University of Pennsylvania (**2000**)
- Adjunct Professor at the New Mexico Institute of Mining and Technology (**1998**)
- Research Advisor for the Center for Micro-Engineered Materials (CMEM) at the University of New Mexico (**1998**)

Manager: Dr. James P. Carney (Dep't 1815, **2019 – present**), Dr. P. Randall Schunk (Dep't 1815, **2015 – 2019**), Dr. William F. Hammetter (Dep't 1843/1815 2004 – 2015). Dr Jun Liu (Dep't. 1846, 2003 - 2004), Dr. Barrett G. Potter, Jr. (Dep't. 1846, 2001- 2003), Dr. Duane B. Dimos (Dep't. 1843, 1999 - 2001), Dr. William F. Hammetter (Dep't. 1846, 1994 - 1999).

Research: Synthesis, characterization, reactivity, and processing of polymetallic and hetero-polymetallic inorganic compounds for use as precursors to complex ceramic materials including doped lead zirconium titanate (PXZT), lead manganese niobium oxide (PMN), barium strontium titanate (BST), strontium bismuth titanate (SBT), aluminum titanate, yttria stabilized zirconium oxide (YSZ), and yttria coatings. Controlled morphological powders as catalyst supports, ferroelectric thin films, lithium battery cathode materials, sodium titanate catalyst, Catalytic Membrane Sensors (CMS). Development of precursors for use in solution-gelation (sol-gel), metalorganic chemical vapor deposition (MOCVD) and nanoparticles (solution precipitation, solvothermal, and electrospinning) for materials, catalytic, electronic and biological applications.

EXPERIMENTAL EXPERIENCE:

Experienced in: the manipulation of very air sensitive compounds, through the use of dry box, glove bag, dual manifold Schlenk lines, high vacuum techniques; processing of these precursors to produce thin films or powders using spin- or dip-coating, metallo-organic vapor deposition (MOCVD) methods, resistive heating vapor synthesis, and/or precipitation methods; electrical characterization of final films and powders.

Demonstrated expertise in the operation and/or theory of:

- Single Crystal X-ray Crystallography (CCD)
- Multinuclear Solution State NMR
- Multinuclear Solid State (CP-MAS)
- Cryoscopic and Isopiestic Molecular Weights
- Fourier Transformed Infrared Spectroscopy (FT-IR)
- Elemental Analysis (EA)
- Gas Chromotography/Mass Spectroscopy (GC-MS)
- UV-Visible-Near Spectroscopy
- Mass Spectroscopy
- Inductively Coupled Plasma (ICP)
- X-ray powder diffraction (XRD)
- Scanning Electron Microscopy (SEM)
- Tunneling Electron Microscopy (TEM)
- Energy Dispersive Spectroscopy (EDS)
- Thermogravimetric Analysis and Differential Thermal Analysis (TGA/DTA)
- BET Surface Area Analysis
- Ellipsometry
- Differential Scanning Calorimetry (DSC)
- Circular Dichroism
- Optical Rotary Dispersion measurements
- Thin Layer Chromatography (TLC)

TEACHING EXPERIENCE:

Numerous mentees: technologists (>10), post-Docs (8), students (>250)

1998 - present John Dustin Clark Award for Outstanding Contribution to Chemistry in New Mexico (**10-13-02**)
Sabbatical at UPenn (**02-08, 2001**)
Adjunct Professor at :
New Mexico Institute of Mining and Technology (**1999)**
University of Pennsylvania (**2000 - 2003**)
Mentor of the Year 1999 (Motorola)
Research Advisor for the Center for Micro-Engineered Materials at the University of New Mexico (UNM) (**1998 - Present**)

1985 - 1990 Teaching Assistant at the University of Kansas: General Chemistry Laboratory

PUBLICATIONS: >200 refereed journal articles

PATENTS: > 25 granted, > 5 pending