What is Materials Chemistry?

The Materials Chemistry specialization is an exciting, interdisciplinary program of research at the intersection of materials science and chemistry. Faculty in this specialization represent a range of research interests from biomaterials to polymers to inorganic nanoparticles. Our research encompasses the chemical synthesis of materials, the molecular and physical basis of materials structure and properties, and the interplay between molecular-level structure, composition, and functional properties.

Paul V. Braun
Electrochemical energy storage; responsive polymers; self-healing materials; mesoscale materials; optical materials; chemical sensors; self-assembly
chemistry.illinois.edu/pbraun

Jianjun Cheng
Polymers for drug delivery; polypeptides; self-healing materials
chemistry.illinois.edu/jianjunc

Andrew A. Gewirth
Materials properties of surfaces and interfaces with relevance to energy storage; electrocatalysis; materials fabrication; electrochemistry
chemistry.illinois.edu/agewirth

Gregory S. Girolami
Synthesis of transition metal and f-metal complexes and their use in catalysis; as precursors for the chemical vapor deposition of micro- and nanoelectronic devices; in energy applications; and for the reprocessing of nuclear fuel
chemistry.illinois.edu/ggirolam

Hee-Sun Han
Synthesis and bioimaging applications of colloidal nanoparticles; micron-sized soft materials for single virus/cell analysis; microfluidics; in vitro/in vivo imaging; single virus/cell sequencing
chemistry.illinois.edu/hshan

Prashant K. Jain
Plasmonics; near-field manipulation of photophysics and photochemistry; super-resolution imaging of active sites in heterogeneous catalysis; artificial photosynthesis; imaging phase transformations in single nanocrystals
chemistry.illinois.edu/jain

Deborah E. Leckband
Biochemistry at material interfaces; protein stability in hybrid biomaterials; biomaterials; colloidal and surface forces; surface engineering
chemistry.illinois.edu/leckband

also see reverse side
Other faculty with interests in Materials Chemistry

Qing Cao (affiliate faculty)
Materials for novel (opto)electronic devices

Qian Chen (affiliate faculty)
Soft matter design, characterization, and applications

Dana D. Dlott (emeritus faculty)
Laser spectroscopy under extreme conditions

Mary L. Kraft (affiliate faculty)
Biological membrane imaging

Lisa Olshansky
Switchable materials for renewable energy applications

Kenneth S. Suslick (emeritus faculty)
Sonochemistry; sensor arrays

Xing Wang (research faculty)
Nucleic acids based nanomaterials for applications in chemistry, biology, and medicine

Hong Yang (affiliate faculty)
Nanomaterials for catalysis

Yi Lu
Functional DNA nanotechnology and its application in directed assembly of nanomaterials with controlled morphologies in response to multiple stimuli, and in photonics, sensing, imaging and targeted drug delivery
chemistry.illinois.edu/yi-lu

Jeffrey S. Moore
Chemistry of self-healing systems; development and study of vascular composites and encapsulated materials; mechanochemical transduction
chemistry.illinois.edu/jsmoore

Catherine J. Murphy
Synthesis, characterization, biological applications and environmental implications of colloidal inorganic nanoparticles; surface chemistry and plasmonic properties of gold nanoparticles; sustainability
chemistry.illinois.edu/murphycj

Ralph G. Nuzzo
The chemistry of materials; nano and micro-scale fabrication; soft materials; integrated devices; self-organizing structures
chemistry.illinois.edu/r-nuzzo

Joaquín Rodríguez-López
Nanoelectrochemistry; advanced electrochemical characterization and imaging of materials and interfaces for electrocatalysis and energy storage; redox polymers; ultrathin electrodes; electrochemical simulation
chemistry.illinois.edu/joaquin

Renske M. van der Veen
Time-resolved and ultrafast characterization of functional nanomaterials; excited-state dynamics; photoswitching, photocatalytic and photovoltaic materials; ultrafast spectroscopy and microscopy
chemistry.illinois.edu/renske

Josh Vura-Weis
Femtosecond X-ray spectroscopy of catalytic reaction intermediates
chemistry.illinois.edu/vuraweis

Steven C. Zimmerman
Development of sustainable polymers; biomaterials for drug delivery; polymeric artificial enzymes
chemistry.illinois.edu/sczimmer