Research Areas

Materials Processing

Research Interests

Research in my group focuses on the materials science and processing of coatings, ceramics and composites. The emphasis is on processing and microstructure control, but some projects also explore the important connections between the structure and the properties. Research projects are collaborative, involving other faculty and colleagues in industry.

A major area of research is coating and printing. Many products are made by coating and printing processes (e.g., adhesive tapes, magnetic storage media, flexible electronics), while others are coated to improve their performance (e.g., laptop screens, biomedical devices, windows). Research in the Coating Process Fundamentals Program of IPRIME (Industrial Partnership for Research in Interfacial and Materials Engineering) addresses fundamental scientific and engineering challenges in the coating and printing process. My coatings research explores processing and microstructure development of coatings prepared by deposition of a liquid (solution, monomer, dispersion of particles) followed by drying or curing. Processing and structural development studies are often coupled with investigations of coating properties including optical, electrical, and mechanical properties. One application area of interest is printed electronics. Another related research activity is 3D printing from liquid precursor.

Selected Publications


A. M. P. Boelens, J. J. dePablo, S. Lim, L. F. Francis, B Y. Ahn, and J. A. Lewis, "Visualization and simulation of the transfer process of index-matched silica microparticle inks for gravure printing," AIChE Journal, 63 (2017) 1419-1429


