Micro- and Nanotechnologies for Americas Strategic Challenges

A variety of significant challenges face the United States and the world in the next few decades. My research group works on micro and nanotechnologies that we hope might provide some help towards meeting these challenges. Our group develops nanoparticle doped radiological scintillators that produce high specificity in neutron detection. This is important as nuclear weapons product neutrons and little else does. We have developed a nanostructured catalyst that is bulk produced to facilitate converting natural gas to synthetic gasoline and diesel. An economic proof of principle five million dollar pilot plant is being constructed in Louisiana. Regular bullets do not support mounted sensors, as they accelerate too fast. Our group has developed rocket bullets, which accelerate at 500G’s, while still reaching traditional velocities. We are also working with nanoparticle doped electrospun polymers and filaments for 3D printing to develop a variety of applications for the Department of Defense.