

MAR17-2016-020295

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Engineering Field-Responsive Soft Materials for Protecting First Responders, Athletes and Astronauts
NORMAN WAGNER, Univ. Delaware

I will show how we are using novel field-responsive polymeric materials as nanocomposites for enhanced ballistic and impact protection, puncture resistant medical gloves, energy absorbing materials for mitigating impacts and concussions, as well as in systems for mitigating micrometeoroid and orbital debris threats in space applications. New mechano-chemical force-responsive polymers will find use as self-healing protective materials. Hierarchically self-assembled block copolymers in ionic liquids form ions-elastomers with unique mechano-electrical response for use in flexible electronics and sensors. Illustrations of technological applications under commercial development will be discussed, including use in astronaut protection and possible application in the manned mission to Mars.