Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effects of added dopants on various triboluminescent properties of europium dibenzoylmethide triethylammonium (EuD_4TEA) CONSTANCE OWENS, Department of Mathematics and Physics, Houston Baptist University, 7502 Fondren Road, Houston TX, 77074, ROSS S. FONTENOT, Department of Physics, Alabama A&M University, Normal, AL 35762, USA, KAMALA N. BHAT, Department of Chemistry, Alabama A&M University, Normal, AL 35762, USA, MOHAN D. AGGARWAL, Department of Physics, Alabama A&M University, Normal, AL 35762, USA — A triboluminescent (TL) material is one that emits light upon pressure, impact, friction, or mechanical shock. TL materials are desirable for investigation because they have the potential to be used as the active element for smart impact sensors. While the material europium dibenzoylmethide triethylammonium (EuD_4TEA) produces a TL emission yield that can be observed by the naked eye, it is still not sufficiently bright for use in smart sensor devices. Previous studies have shown that additional materials can be combined with EuD_4TEA in order to improve the TL emission yield. In this paper, we discuss the effects of doping on EuD_4TEA at different concentrations with a variety of materials on the TL emission yield and decay times. The dopants that were used in this study were nicotine, dibutyl phosphate (DBP), and magnesium. We also discuss both the effects of pH on EuD_4TEA, and the doping effects on impact energy. For testing triboluminescent properties, we use a custom-built drop tower that generates triboluminescence by fracturing compounds through impact. Collected data is analyzed using specially written LabVIEW programs.

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Date submitted: 13 Nov 2013 Electronic form version 1.4