

Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Environmentally Responsible Energetic Materials: Another Look at the Styphnates ADAM COLLINS, TIMOTHY ANGLISS, WILLIAM PROUD, University of Cambridge, FRACTURE AND SHOCK PHYSICS, SMF GROUP TEAM — Lead Styphnate (lead 2,4,6-trinitroresorcinate) has many applications as a primary explosive, most notably in priming compositions. Its largest drawback, however, is the toxicity of lead. Heavy metals often feature in primary explosives, providing favourable density, bonding, and reaction products; but, the toxic nature of heavy metals makes these explosives of limited use. Current research efforts are being made to design new energetic materials (such as those based around the 5-nitrotetrazole molecule), but familiar energetics can still be of use. The styphnate anion provides many favourable energetic qualities (such as a ring structure and nitro groups), and while the lead salt has proven its usefulness, other metallic styphnates also provide a range of energetic qualities. This paper reports on ignition thresholds, energetic output, and thermal properties of the following salts of trinitroresorcinol: Barium, Bismuth, Calcium, Copper, Lithium, and Lead. Such information provides a list of characterized energetic materials, but also insight into how metal cations can control measurable energetic effects at the molecular and crystal level.

Adam Collins
University of Cambridge

Date submitted: 17 Feb 2009

Electronic form version 1.4