PARARI abstract submission

Presenter:	Madeleine A. Dallaston (University of Queensland, Brisbane) Madeleine is a 2nd year organic chemistry PhD candidate at the University of Queensland. She completed her undergraduate degree at Griffith University in 2016 before moving to UQ for honours and a PhD.
Presentation type:	Technical Brief
Authors:	Madeleine A. Dallaston (University of Queensland, Brisbane) Jason S. Brusnahan (Defence Science and Technology Group, Edinburgh) Craig Wall (Defence Science and Technology Group, Edinburgh) Craig M. Williams (University of Queensland, Brisbane)

Cubanes as fuels for spectrally matched infrared countermeasures.[1]

The ever-advancing capabilities of infrared seeking missiles necessitates the constant development of new countermeasure technology. Spectral flares aim to more closely mimic the infrared emission of an aircraft, and therefore be better able to decoy some advanced missiles. Oxygenated aromatic fuels have been shown to produce a suitable emission spectrum, however due to their low energy content they do not produce sufficient spectral efficiency. New high-energy fuels which also assist in the evolution of selectively emitting combustion products are required to realise these new spectral flares. Cubane is a high-energy carbon-based scaffold which may be suitable for use as a fuel in spectral flares.

In this study a series of cubanes were investigated for their suitability as spectral flare fuels. Their heats of formation and strain energies were predicted *in silico*, and their thermal and impact sensitiveness were investigated. All were found to undergo highly exothermic decomposition in sealed cell differential scanning calorimetry, and two cubanes subsequently underwent quantitative impact, friction, and electrostatic discharge sensitiveness testing. A correlation between decomposition energy, onset temperature, and impact sensitivity will also be discussed.

[1] M. A. Dallaston, J. S. Brusnahan, C. Wall, C. M. Williams, *Chem. – A Eur. J.* **2019**, doi: 10.1002/chem.201901086.