## TGA coupled FTIR

## For

## Synthesis and Energetic Properties of Homocubane Based High Energy Density Materials

Sohan Lal,<sup>a</sup> Arindrajit Chowdhury,<sup>b\*</sup> Neeraj Kumbhakarna,<sup>b\*</sup> Sundaramoorthy Nandagopal,<sup>c</sup> Arvind Kumar,<sup>c</sup> Irishi N. N. Namboothiri<sup>a\*</sup>

Department of Chemistry,<sup>a</sup> Department of Mechanical Engineering,<sup>b</sup>Indian Institute of Technology Bombay, Mumbai, 400 076, India, irishi@iitb.ac.in, arindra@iitb.ac.in, neeraj\_k@iitb.ac.in

High Energy Materials Research Laboratory, Defence Research and Development Organisation, Pune 411 021, Maharashtra, India<sup>c</sup>

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**Fig-IR-1.** Comparison of vibrational spectra of compound **8**: products at (a) 201 °C (b) 254°C °C (c) 275 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-2.** Comparison of vibrational spectra of compound **9**: products at (a) 127 °C (b) 212 °C (c) 227 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-3.** Comparison of vibrational spectra of compound **10**: products at (a) 94 °C (b) 201 °C (c) 224 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-4.** Comparison of vibrational spectra of compound **11**: products at (a) 105 °C (b) 201 °C (c) 216 °C at 15K min<sup>-1</sup>, and (d) condensed phase;



**Fig-IR-5.** Comparison of vibrational spectra of compound **12**: products at (a) 134 °C (b) 200 °C (c) 217 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-6.** Comparison of vibrational spectra of compound **13**: products at (a) 142 °C (b) 223 °C (c) 308 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-7.** Comparison of vibrational spectra of compound **14**. products at (a)  $127^{\circ}$ C (b)  $210^{\circ}$ C (c)  $228^{\circ}$ C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-8.** Comparison of vibrational spectra of compound **15**: products at (a) 236 °C (b) 244 °C (c) 326 °C at 15K min<sup>-1</sup> (d) condensed phase.



**Fig-IR-9.** Comparison of vibrational spectra of compound **18**: products at (a) 51 °C (b) 141 °C (c) 186 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-10.** Comparison of vibrational spectra of compound **19**: products at (a) 152 °C (b) 223 °C (c) 232 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-11.** Comparison of vibrational spectra of compound **21a**: products at (a) 228 °C (b) 273 °C (c) 339 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-12.** Comparison of vibrational spectra of compound **25**: products at (a) 193 °C (b) 273 °C (c) 318 °C at 15K min<sup>-1</sup>, and (d) ) condensed phase.



**Fig-IR-13.** Comparison of vibrational spectra of compound **27**: products at (a) 261 °C (b) 270 °C (c) 287 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-14.** Comparison of vibrational spectra of compound **28**: products at (a) 242 °C (b) 262 °C (c) 280 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-15.** Comparison of vibrational spectra of compound **30a**: products at (a) 248 °C (b) 283 °C (c) 307 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-16.** Comparison of vibrational spectra of compound **30b**: products at (a) 262 °C (b)  $276^{\circ}$ C (c) 464 °C at 15K min<sup>-1</sup>, and (d) condensed phase.



**Fig-IR-17.** Comparison of vibrational spectra of compound **30c**: products at (a) 226 °C (b) 276 °C (c) 353 °C at 15K min<sup>-1</sup>, and (d) condensed phase.