Supporting Information

An approach towards plastic scintillators from thermally activated delayed fluorescent dyes and cross-linkable bismuth compounds

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Scheme S1. Synthesis of CMB



Figure S1. ¹H (bottom) and ¹³C (top) NMR spectra of CMB in DMSO-D₆



Figure S2. Prompt life time traces of a) A0 & A40; b) B0 & B40



Figure S3. Microindentation measurements and analysis of **AR0**, **A0**, and **A40**. a) The raw indentation load-displacement measurements, and b) the corresponding indentation stress-strain curves from which the Young's modulus and the 0.2% offset indentation yield strength are obtained. The indentation yield strength is divided by 2.0 to estimate the uniaxial yield strength.



Figure S4. TGA of CMB



Figure S5. DSC of a) A0; b) A40; c) B0; B40

| | Mass | Fill | |
|------|----------|--------|---------|
| Bi % | Fraction | Factor | Density |
| 5 | 0.05 | 0.074 | 1.080 |
| 10 | 0.10 | 0.144 | 1.118 |
| 15 | 0.15 | 0.211 | 1.155 |
| 20 | 0.20 | 0.275 | 1.190 |
| 25 | 0.25 | 0.336 | 1.223 |
| 30 | 0.30 | 0.395 | 1.255 |
| 35 | 0.35 | 0.450 | 1.285 |
| 40 | 0.40 | 0.503 | 1.314 |
| 45 | 0.45 | 0.554 | 1.342 |
| 50 | 0.50 | 0.603 | 1.369 |
| 55 | 0.55 | 0.650 | 1.394 |
| 60 | 0.60 | 0.695 | 1.419 |
| 65 | 0.65 | 0.738 | 1.442 |
| 70 | 0.70 | 0.780 | 1.463 |

Table S1. Calculated densities for varying Bi loading in PVT scintillators



Figure S6. Reaction type dependence on bismuth loading (1 wt.% **4CzIPN**, varying compositions of **CMB**). The reaction rates are reported as a fraction of that reaction type. The curves at all points sum to unity. Simulation was done with a ¹³⁷Cs source



Figure S7. Top view of the experimental set up used for measuring Cs-137 spectra, scintillator wrapped in Teflon tape coupled to PMT R2059 with source at 3.175 cm. The PMT was placed in a black light tight box wooden box during data acquisition.