

Table S1. Properties of the bursts presented here. XRF 050406 was discovered by the *Swift* BAT instrument at 15:58:48 UTC on 6 April 2005. It had a very soft spectrum (power-law spectrum $F_x(E) \propto E^\beta$ with spectral energy index $\beta = -1.4$) and is classified as an X-ray Flash (XRF; ¹). The *Swift* observatory performed a prompt slew to the burst location, pointing the XRT and the UV-Optical Telescope (UVOT) toward the burst in ~84 seconds and the XRT executed its normal sequence of readout modes (²). No bright source was found in the first 2.5 s XRT exposure, but the count rate began climbing rapidly about 180 s after the BAT trigger (Figure 1a). GRB 050502B was a typical multi-peaked burst discovered by the *Swift* BAT instrument at 09:25:40 UTC on 2 May 2005. The *Swift* observatory performed a prompt slew and the XRT began collecting data ~63 seconds after the burst trigger. No bright source was found in the first 2.5 s exposure. About 300 seconds after the burst, the X-ray intensity began to rise steeply, switching the XRT from Photon Counting (PC) mode into Windowed Timing (WT) mode through the peak at 740 s post-burst (Figure 1b; see ref. 2 for a discussion of XRT readout modes)

| Burst Name | Trigger time | T_{90} (s) [†] | Energy Index | Prompt Fluence (ergs cm ⁻²) | Ref. |
|-------------|------------------------------|---------------------------|----------------|---|------|
| XRF 050406 | 6 April 2005 15:58:48 UTC | 5 ± 1 | -1.4 ± 0.3 | 9×10^{-8} | 3,4 |
| GRB 050502B | 2 May 2005 09:25:40 UTC | 17.5 ± 0.2 | -0.6 ± 0.1 | 8×10^{-7} | 5,6 |

[†] T_{90} is the burst duration, defined as the time within which 90% of the photons arrived.

¹ J. Heise, J. in't Zand, R. M. Kippen, P. M. Woods, in *Gamma-Ray Bursts in the Afterglow Era*, E. Costa, F. Frontera, J. Hjorth, Ed. (Berlin Heidelberg: Springer, 2001), p. 16.

² J. E. Hill et al., *Proc. SPIE* **5165**, 217 (2004).

³ A. Parsons et al., *GCN Circ.* **3180** (2005).

⁴ H. Krimm et al., *GCN Circ.* **3183** (2005).

⁵ A. Falcone et al., *GCN Circ.* **3330** (2005).

⁶ J. Cummings et al., *GCN Circ.* **3339** (2005).