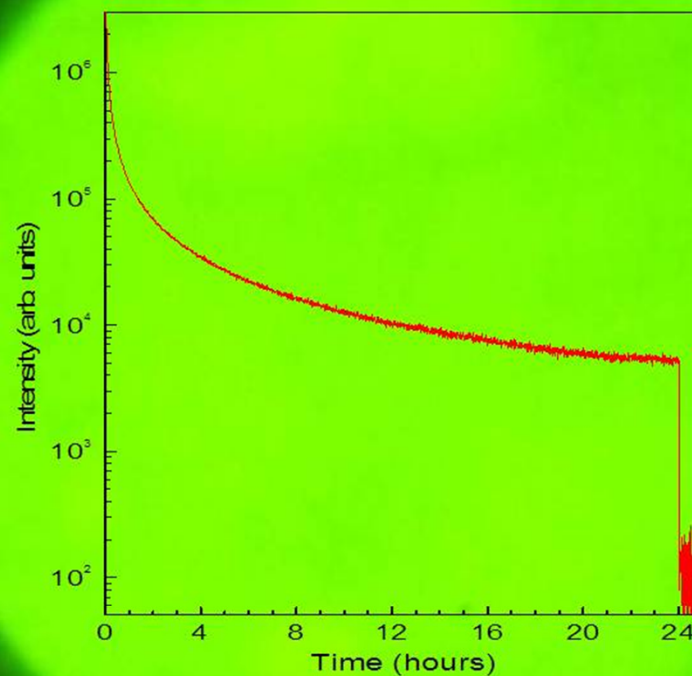


Novel Long-Persistent Near Infrared Phosphors for Efficient Solar Energy Absorption and Conversion



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We develop a novel series of Cr³⁺-activated zinc gallogermanate (ZGGO:Cr) NIR long-persistent phosphors that exhibit superior capabilities in excitation energy (300–600 nm) absorption, storage, NIR (650–950 nm) light conversion, and persistent NIR light emission. Seconds to minutes of activation (including UV light, sunlight and fluorescent tube light) can result in more than 100 hours of persistent NIR light emission.



The ZGGO:Cr phosphors can be efficiently activated by solar radiation in various outdoor environments. Specifically, the phosphors can be rapidly, effectively, and repeatedly charged by sunlight in various weather conditions, at any moment between sunrise and sunset, and at various outdoor locations, and the materials exposed to these various outdoor environments exhibit comparable NIR persistent luminescence behaviors.

The ZGGO:Cr phosphors can act as luminescent convertors in photovoltaics, identification taggants in defense and security and optical probes for *in vivo* deep tissue bio-imaging.