

Abstract Submitted  
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**Measurements of In-Plane Thermal Diffusivities of Layered Organic Semiconductors by ac-Calorimetry**<sup>1</sup> HAO ZHANG, YULONG YAO, JOSEPH BRILL, University of Kentucky — We are using the position-dependent ac-calorimetric technique of Hatta *et al*<sup>2</sup> to measure the in-plane thermal conductivity of layered organic semiconductors, such as 6,13-bis(triisopropylsilylethynyl) pentacene (TIPS-pn).<sup>3</sup> Chopped light is used to heat the sample, part of which is screened from the light, with the thermometer placed on the back of the sample in the screened region. In the “infinite crystal length” limit, the logarithm of the oscillating temperature as well as its phase shift decrease linearly with distance of the thermometer from the edge of the screen, with a slope inversely related to the thermal diffusivity. Materials like TIPS-pn have surprisingly large values of thermal diffusivity,  $D > 1 \text{ mm}^2/\text{s}$ , making finite size effects important, since crystal lengths are typically  $< 1 \text{ cm}$ . We will discuss our technique and results in detail, including the effects of finite crystal size on the measurements of phase and magnitude of the oscillating temperature.

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<sup>2</sup>I. Hatta *et al*, Jpn. Jnl Appl. Phys. **25**, L493 (1986).

<sup>3</sup>J.E. Anthony, Chem. Rev. **106**, 5028 (2006).

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