

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Ultrasensitive Solution Processed Polymer Photodetectors

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— Semiconducting polymeric optoelectronic and electric devices have evolved as a promising cost-effective alternative to silicon-based devices. Organic photodetectors have been the subject due to several inherent advantages. Some of the important advantages of these so-called “plastic” electronics include large-area detection, low cost of fabrication, ease of processing and mechanical flexibility. However, there are few reports on organic photodetectors whose performances are comparable with inorganic counterparts. will report ultrasensitive solution processed photodetectors fabricated by different semiconducting polymers as the electron donors and various fullerenes derivatives and/or inorganic quantum dots as the electron acceptors. Polymer photodetectors with different photo-response and detectivity were demonstrated. One example is that polymer photodetectors have photo-response from 300nm to 1450nm, the detectivity larger than 10^{12} cm Hz^{1/2}/W, and linear dynamic range larger than 120 dB. All these values are comparable to or even better than their inorganic counterparts.

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Date submitted: 23 Nov 2008

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