

Title: Colour filtering in a-SiC : H based p-i-n-p-i-n cells: A trade-off between bias polarity and absorption regions

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Abstract: A large area colour imager optically addressed is presented. The colour imager consists of a thin wide band gap p-i-n a-SiC:H filtering element deposited on the top of a thick large area a-SiC:H(-p)/a-Si:H(-i)/a-SiC:H(-n) image sensor, which reveals itself an intrinsic colour filter. In order to tune the external applied voltage for full colour discrimination the photocurrent generated by a modulated red light is measured under different optical and electrical bias. Results reveal that the integrated device behaves itself as an imager and a filter giving information not only on the position where the optical image is absorbed but also on its wavelength and intensity.

The amplitude and sign of the image signals are electrically tuneable. In a wide range of incident fluxes and under reverse bias, the red and blue image signals are opposite in sign and the green signal is suppressed allowing blue and red colour recognition. The green information is obtained under forward bias, where the blue signal goes down to zero and the red and green remain constant. Combining the information obtained at this two applied voltages a RGB colour image picture can be acquired without the need of the usual colour filters or pixel architecture. A numerical simulation supports the colour filter analysis. (c) 2006 Elsevier B.V. All rights reserved.

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