Flexible Organic Photo-Transistors As Key Elements Of Detectors for Medical Proton Therapy: Recent developments at NanoMicroFab

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In the last few years, most of the applications in the field of light-sensing have required devices able to detect light intensities as low as pW/cm2. At the same time, the rise of organic-based sensors is meeting no stops, because of the desired properties that organic materials provide like flexibility, lightweight, low cost and low-temperature processability. Low-intensity light signal detectors are growing in a huge number of fields such as imaging, radiation detectors and biomedical sensing. Here, we report on flexible organic phototransistors (OPTs) with impressive low light detection, with a LoD down to 28 pW/cm2 fabricated at NanoMicroFab facilities of Rome-CNR Tor Vergata1. The OPTs work reliably in different environments, at low polarization bias down to -1 V 2. These organic phototransistors have been used to develop flexible, fully organic detectors for proton beams with a limit of detection of 0.026 Gy/min 3. Flexibility and biocompatibility of these detectors allow their application in several biomedical fields, such as in-situ dose monitoring during proton therapy. These results show a perspective of a new class of light detectors based on a low-cost manufacturing process for flexible applications.

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References

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