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# Biocompatible flexible photosensors based on 2D materials and crystalline organic semiconductors

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Vision is the sense humans rely the most on in daily activities. It is allowed by the presence of natural photoreceptors in the eye that absorb the incident light and transmit the visual inputs to the brain.
The degeneration of natural photoreceptors in the eye leads to debilitating visual impairments, such as Age-Related Macular Degeneration (AMD) which is one of the leading causes of legal blindness, affecting millions of people worldwide.
One promising strategy to restore vision are implantable artificial light sensors. These would mimic the natural photoreceptors by converting light into electric stimuli for the brain. Organic semiconductors, which combine good optoelectronic properties (as good light detection and good photogeneration) with flexibility and biocompatibility are ideal candidates for such biological applications.
This project aims to fabricate and characterize photodetectors based three organic semiconductors, each capable of light sensing in the red, green or blue portions of the visible light spectrum.
The first step will consist on the selection and purification of the organic materials, growing single crystals by Physical Vapor Transport. Photodiodes will, then, be fabricated and assembled in a stacked structure or pixel array to allow colour sensing. Finally, optical characterization will be performed to evaluate the performance of the devices.
Ideally, this research would contribute to the advancement of implantable photosensors, focusing on optimizing photodetection and photocurrent generation, as well as enabling colour sensing.

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