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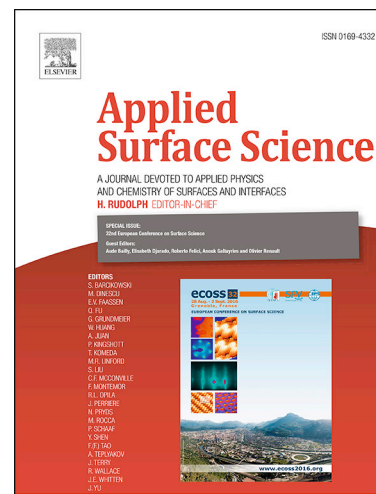
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Highly fluorescent carbon dots from enokitake mushroom as multi-faceted optical nanomaterials for Cr⁶⁺ and VOC detection and imaging applications

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ABSTRACT

Carbon dots are optically unique materials for sensing applications that can be prepared from various raw natural materials. In this work, highly fluorescent carbon dots were synthesized from enokitake mushroom via a one-step hydrothermal method in the presence of diluted sulfuric acid. The spherical carbon dots, with an average diameter of 4 nm, exhibited blue photoluminescence under UV illumination and a quantum yield of 11%, increasing to 39% upon passivation with tetraethylenepentamine. We employed both photoluminescence and light absorption properties of carbon dots for Cr⁶⁺ and volatile organic compound (VOC) sensing. Their fluorescence emission was selectively quenched by Cr⁶⁺ with a limit of detection of 0.73 μM. A fluorescent colorimetric paper-based device was fabricated and demonstrated to

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