Sustainable synthesis of Carbon Dots from industrial orange peel waste for catalysis and photocatalysis applications

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The industry of orange juice generates a huge amount of orange peel waste (OPW) that requires suitable management. So the aim of this work is the conversion OPW into new and useful nanoparticles: the carbon dots (CDs). These has been synthetized by a simple and eco-friendly hydrothermal and electrochemical (EC) approach. Thanks to EC procedure CDs can be produced in mild reaction conditions with high yields and purity, using simple instrumentation and affordable cost for mass production. The nanoparticles have been characterized by SEM, FT-IR analysis and optical properties and quantum yield have been evaluated by UV-Visible and PL measurements. The synthetized bio-based CDs have been tested as heterogeneous catalyst in carbon-carbon bond reactions and also in the applications for metal ions and nitro compounds detection.