

Nanomaterials for PhotoVoltaic: a spotlight on sustainability

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Emerging photovoltaic technologies (Dye-Sensitized and Perovskite Solar Cells) have been proposed as valid alternative of conventional photovoltaic (*i.e.* Silicon-based device) for not-intrusive Building Integrated PhotoVoltaic (BIVP) and indoor application. Yet, considering the dramatic drop of the silicon technology prize ($0.25 \text{ \$/W}_p$), emerging PV should couple good efficiency with low cost and improved sustainability, also complying with the Sustainable Development Goal drew up by the United Nation. An improved sustainability should begin from a thoughtful design of the device component and their synthesis, that should consider energy- and emission-saving procedure as well as the employment of waste-derived, recycled or bio-based materials. Then long-term (> 20 years) stability of the device should be ensured along with innovative recycling strategies. If possible, Life Cycle Assessment should be used to evaluate the overall sustainability of a selected technology.