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technologies and processes in the energy transition*

Abstract Book

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Obiettivo principale dell'operazione

“Scenari energetici del futuro”

Spoke 1 aims at boosting the Photovoltaics (PV) and Concentrated Solar Power/Concentrated Solar Thermal (CSP/CST) sectors toward higher amount of renewable energy production at competitive costs, overtaking actual limits and introducing innovative research at low Technology Readiness Level (TRL).

RAMAN SPECTROSCOPY CHARACTERIZATION OF COATING LAYERS IN GLASSES FOR BIPV APPLICATIONS

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Laminates for Building Integrated PhotoVoltaic (BIPV) are generally composed, from the external surface towards the internal one, by: front cover, front encapsulant, solar cell layer, rear encapsulant and rear cover [1]. In particular, the front cover is made by the bulk material, usually glass, with its both external and internal surfaces. The former plays an important role in BIPV modules, due to its functional tasks: to reduce solar radiation reflection by the external side, in order to increase energy conversion efficiency, and to provide the requested aesthetic appearance [2]. Commercial glasses used as the front cover of laminates for BIPV applications are often coated on one side with a layer of material with functional characteristics that enhance both system efficiency and aesthetics.

Inside a long lasting collaboration between the Dipartimento di Fisica e Chimica “Emilio Segré” (DiFC) of the Università di Palermo (UniPa) and the Institute for Renewable Energy, Eurac Research (Bolzano), several samples of coated glasses to fabricate laminates for BIPV applications were sent by Eurac to DiFC to perform several optical tests on them, in particular Raman spectroscopy, both on the coated side and on the uncoated one, to gain needed informations.

In this work, the investigation performed by Raman spectroscopy on the coating sides of above samples, including the specific analysis of the features detected by the optical microscope observation on the coating surfaces, are described, and the related results are reported and discussed.

[1] T. E. Kuhn et al., Review of technological design options for building integrated photovoltaics (BIPV), *Energy & Buildings*, 231, (2021), 110381.

[2] J. Deubener et al., Glasses for solar energy conversion systems, *Journal of the European Ceramic Society*, 29, (2009), 1203–1210.