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# Advanced polymeric coatings in photovoltaics: accessing multifunctionality for improved device performance

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Photovoltaic (PV) technology has evolved rapidly in the past few decades and now encompasses a large variety of materials and device structures. A key aspect to be taken into account in any PV technology is the operational durability of these systems in outdoor conditions and their ability to retain functionality upon prolonged use. Clearly, loss of performance during operation represents a significant drawback and limitation for their commercialization. In this context, the large compositional flexibility of polymeric materials as well as their proven easy processability may be of great help in imparting improved durability and multifunctionality to solar energy devices.

In this contribution, a series of polymeric systems will be presented that find application as multifunctional coatings for different next-generation PV and solar energy devices, including dye-sensitized solar cells, organic PVs, perovskite solar cells and luminescent solar concentrators.[1-3] Aspects related to the chemical functionalization of the coating precursors will be addressed in view of the incorporation of multiple functionalities into the final coating material. In addition, a thorough chemical and physical characterization of the coating materials will be presented. The functional properties of these systems will be evaluated after their integration into operating devices.

It will be demonstrated that by synthetically tuning the functionality of the coating systems as a function of the target technology, improved performance can be achieved.

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[2] *D. Pintossi, G. Iannaccone, A. Colombo, F. Bella, M. Välimäki, K.-L. Väisänen, J. Hast, M. Levi, C. Gerbaldi, C. Dragonetti, S. Turri, G. Griffini, Adv. Electronic Mater., 2 (2016) 1600288.*

[3] *F. Bella, G. Griffini, J.-P. Correa-Baena, G. Saracco, M. Grätzel, A. Hagfeldt, S. Turri, C. Gerbaldi, Science 354 (2016) 203.*

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