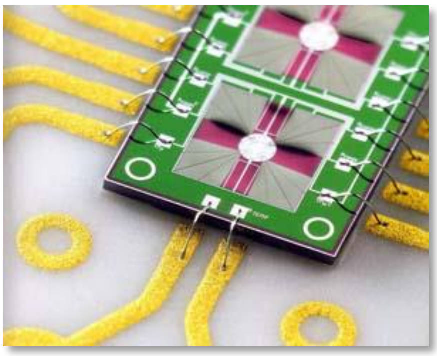
COLOQUIOS 2019

Revealing the Absolute Composition of **Organic Solar Cells** by Fast Scanning Calorimetry

Most efficient organic photovoltaic (OPV) cells comprise a polymeric donor and a small-molecule acceptor blended in a so-called bulk heterojunction (BHJ) thin film architecture. The BHJ morphology is complex; it is now, for instance, well-known that most BHJ blends used in OPVs are at least to a certain extent finely intermixed, only sometimes featuring entirely phase-pure domains. Because donor:acceptor interphases are expected to be involved in the most relevant photophysical processes of the solar cell, such as the exciton dissociation and the charge recombination, it is imperative to elucidate how intermixed phases relate to device characteristics. However, due to the nature of intermixed domains – reduced size, poor contrast, etc. –, the experimental characterization of intermixed phases has turned out to be difficult, and key aspects , e.g. their absolute composition, still remain elusive. Recognizing this scientific problem, our lab has been investigating on a new methodology based on MEMS-based fast scanning calorimetry that allows, for the first time, to readily determine the absolute composition of intermixed domains in BHJ solar cells. The method exploits the well-known fact that the vitrification temperature (i.e. the Tg) of a finely intermixed glassy blend depends coherently on the relative amount of components in the blend. We will show the applicability of our method to various donor:acceptor systems along with our first conclusions about how composition of intermixed domains impact photophysical processes in these devices.



Dr. Jaime Martín

UPV/EHU-POLYMAT

Lunes 1 de abril de 2019 a las 12:00 h

Sala de Conferencias del
Centro de Física Miguel A. Catalán
C/Serrano 121, 28006 Madrid