GRAPHENE DERIVATIVES FOR THE ASSEMBLY OF ORGANIC SOLAR CELLS

Yaily Fernández-Arteaga[1*], Daniel Romero-Borja[1§], Juan Nicasio-Collazo[1], José Luis Maldonado[1]

[1] Research Group of Optical Properties of Materials (GPOM), Optical Research Center (CIO), León, Guanajuato, México
[§]Current postdoctoral fellow at Center for Polymers and Organic Solids, Department of Chemistry and Biochemistry, University of California Santa Barbara, Santa Barbara, USA
** E. mail: yaily@cio.mx*

ABSTRAC

In the present work, organic solar cells based on PTB7:PC71BM as an active layer (**AL**) and using the alternative top electrode named Field's metal (**FM**, a eutectic bismuth (Bi), indium (In) and tin (Sn) alloy) were manufactured under direct configuration, introducing the graphene derivatives into these devices. The used architecture, as reference, was glass/ITO/PEDOT:PSS/PTB7:PC71BM/PFN/FM (**1**). Reduced graphene oxide (rGO) and solution-processable functionalized graphene (SPFG) were synthesized in the laboratory. They were used as a hole transport layer (HTL) and as a third component of the **AL** respectively.

INTRODUCTION

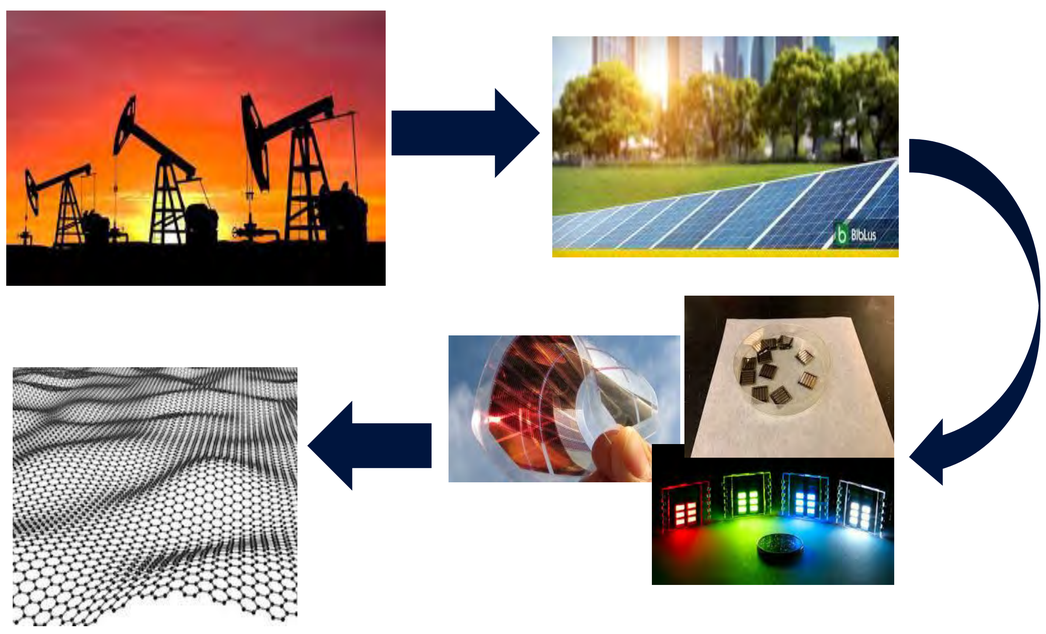

Fig. 1 Necessity to use renewable energy.

METHODOLOGY

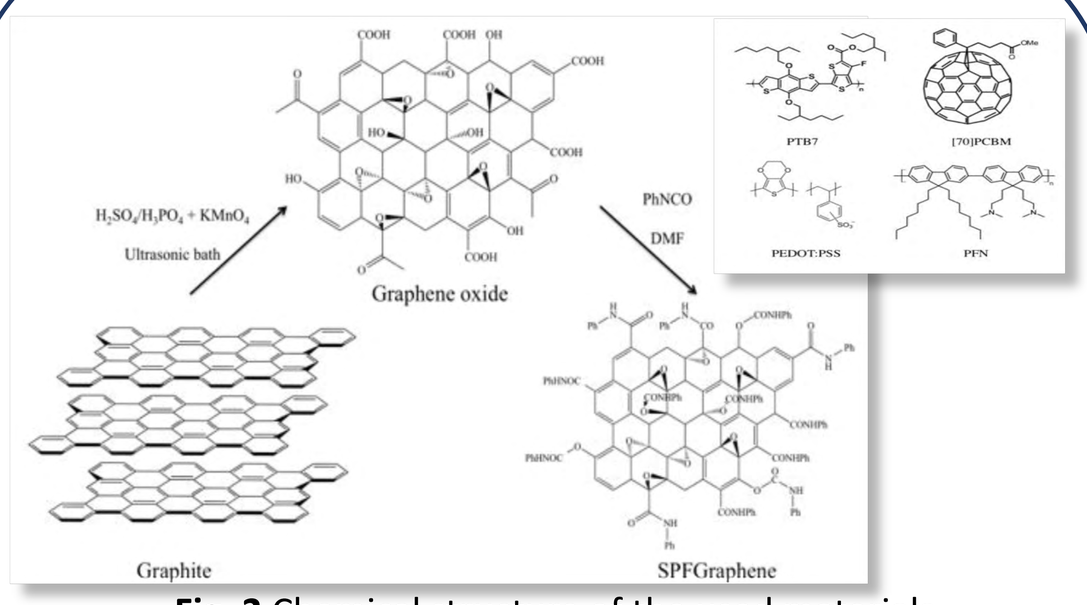

Fig. 2 Chemical structure of the used materials.

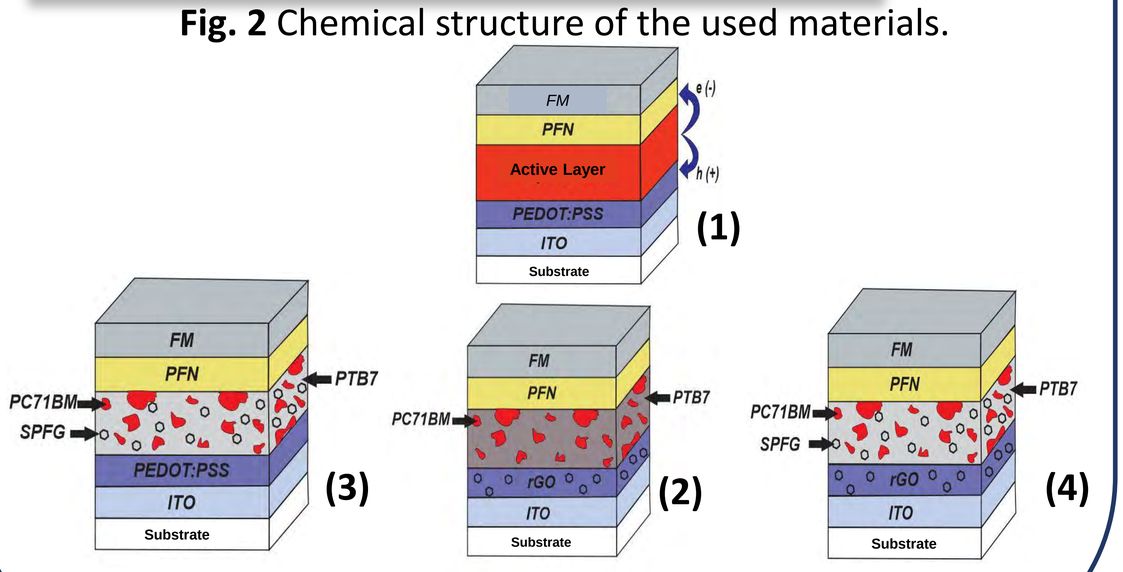

Fig. 3 Architectures of the manufactured OPVs cells.

RESULTS

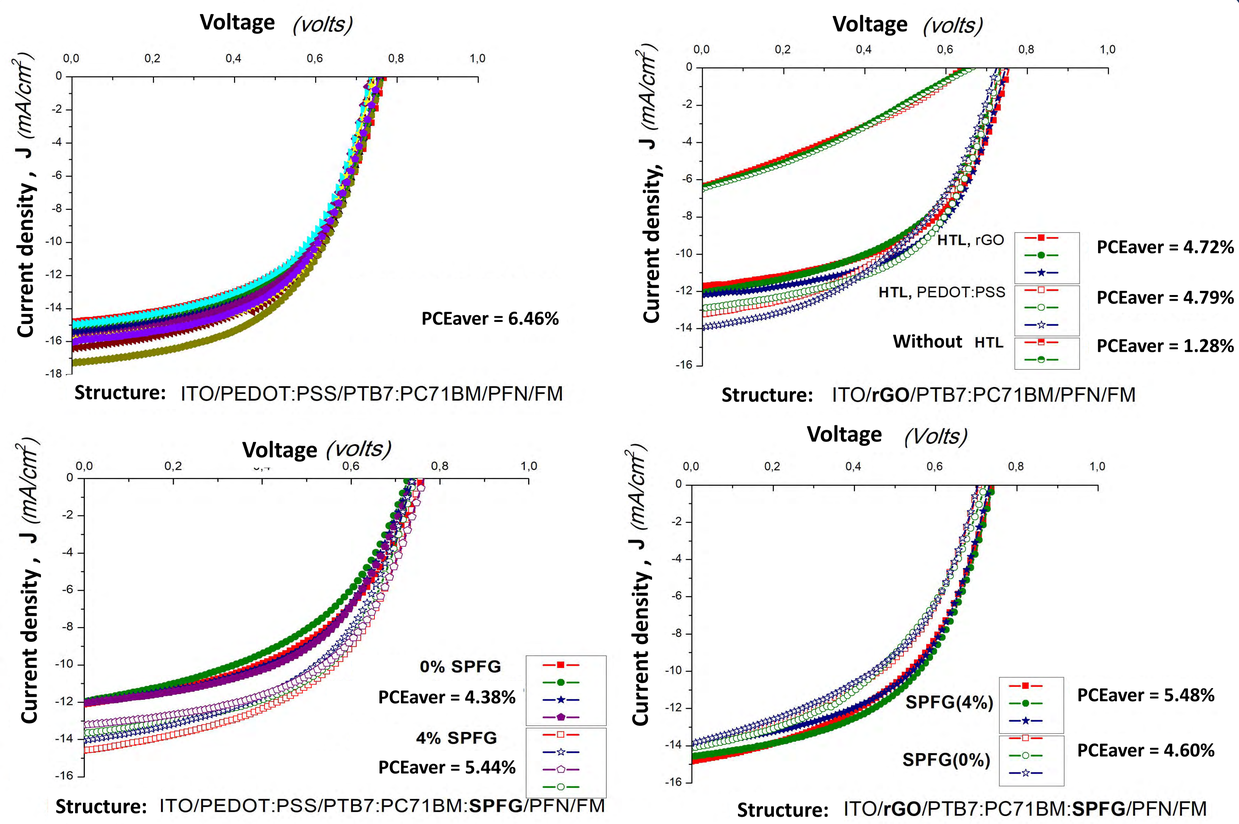

Fig. 4 J-V curves of the different architectures of OPVs cells.

Fig. 5 Solar panel prototype in operation.

CONCLUSIONS

The achieved results represent an increase of 21 and 22 % of the PCE_{aver} for ternary AL (**3** and **4**) with respect to the reference solar cells (**1**). It should be noted that for this work the manufacturing was carried out outside the glove box and also that the used top electrode, **FM**, was deposited by the drop coating technique. Finally, it should be mentioned the benefits provided by the use of graphene derivatives in different parts of the devices structure, an increase in their flexibility and transparency.

REFERENCES

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