Solution-processed organic lasers with top-layer nanostructured resonators

María A. Díaz-García[1,2], Víctor Bonal[1,2], Rafael Muñoz-Mármol[1,2], Marta Morales-Vidal[1,2], José M. Villalvilla[1,2], Pedro G. Boj[1,3], José A. Quintana[1,3]

Dpto. Física Aplicada[1], Inst. Universitario de Materiales[2] and Dpto. Óptica[3], Universidad de Alicante, Alicante 03080, Spain
maria.diaz@ua.es

Solution-processed organic lasers are very attractive light sources due to their advantages of chemical versatility, wavelength tunability, mechanical flexibility and low cost. Particularly interesting for applications in the fields of optical communications, biosensing and chemical sensing are distributed feedback (DFB) lasers, consisting of nanostructured active organic waveguides. In this presentation we will discuss recent advances of our research group towards improving both, the active laser material and the laser resonator. Particularly, we will focuss on lasers with a novel device architecture (Figure 1) with a resonator fabricated by a method developed in our laboratory, consisting on a top-layer polymeric layer with an holographycally engraved one-dimensional relief grating, which shows various advantages with respect to other configurations [1]. We will show results for different types of active laser materials, including organic compounds, such as as carbon-bridged phenylenevinylene oligomers [2] or polymers [3], perylenediimide dyes [4] and other very novel nanomaterials related to graphene.

References

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Figures

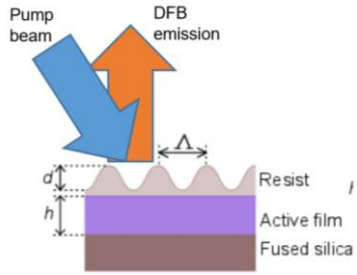

Figure 1: Sketch of organic DFB laser with top-layer polymeric resonator, including pump and collection geometry.