Metal-oxide (MO) thin films obtained by laser curing: their integration in devices for opto-electronics.

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ABSTRACT:

Metal-oxide (MO) materials are transparent in the visible range, chemically inert, have good mechanical properties and high refractive indices. Their integration in devices for optics, photonics and micro-electronics is therefore widely developed1. Different processes can be used to prepare MO thin films, but the sol-gel route represents the lowest cost technique with a high degree of versatility, regarding the chemical composition and the resulting optical properties. However, temperatures between 300°C and 600°C are required to cure such materials and thus, limiting their integration on polymeric and other low thermal resistance substrates. Here, we present an alternative curing method developed by our team2,3, based on Deep-UV (DUV) and near-infrared (NIR) irradiation.

Figure 1: Schematic of thin films obtained by laser curing from MO precursors

Particularly, metal-oxide materials such as TiO2 and ZrO2 had been integrated in a plasmonic sensor made of plastic optical fibers (POF), in order to improve the performances regarding the sensitivity4. Among other devices, the integration of indium-doped zinc oxide (IZO) thin films was also performed on carbon composite to monitor the mechanical constraints. It could prevent a potential breakage of some protective equipment in sport activities...

In summary, this poster demonstrates the high versatility of the sol-gel route combined with laser curing, to design a wide range of sensors.

References