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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 developed[1]. 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 team[2,3], based on Deep-UV (DUV) and near-infrared (NIR) irradiation.

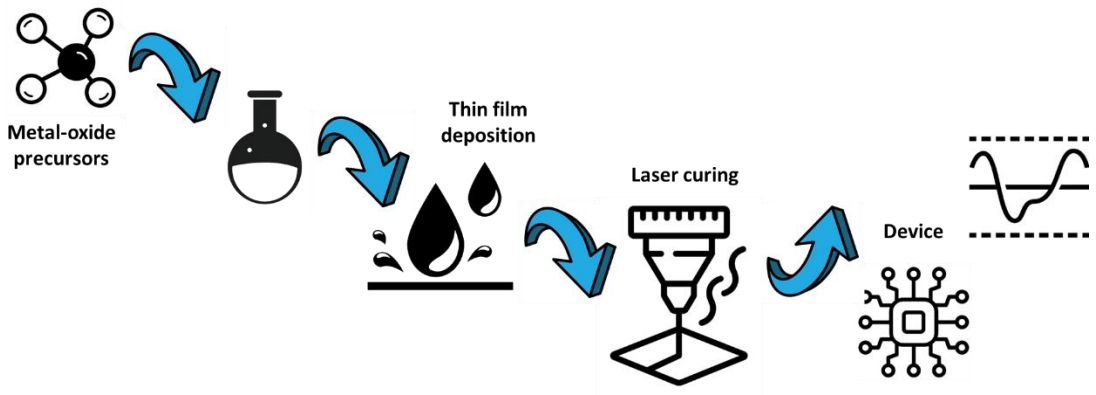

Figure 1: Schematic of thin films obtained by laser curing from MO precursors

Particularly, metal-oxide materials such as TiO_2 and ZrO_2 had been integrated in a plasmonic sensor made of plastic optical fibers (POF), in order to improve the performances regarding the sensitivity[4]. 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

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