

Improving the sensitivity of Raman signal of ZnO thin films deposited on silicon substrate

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Abstract: Raman spectroscopy results of DC reactive sputtering of ZnO thin films deposited on silicon substrates are reported. Monocrystalline silicon wafers are frequently used as substrates for thin film deposition, and when working on thin films materials of rather low Raman cross-sections such as ZnO, it is difficult and even sometimes hopeless to extract the Raman information relevant to the film from the silicon signal. In this paper, we show that using a 457 nm wavelength of the laser excitation combined with the effect of silicon Raman selection rules through convenient orientation of the silicon substrate, the 520 cm⁻¹ Si signal can be sufficiently attenuated to give access to the ZnO Raman information, whatever the important difference of intensity between them.

Keywords : Raman spectroscopy, Thin films, Silicon, Zinc oxide, DC reactive sputtering deposition