CDTE WHISKERS PROMTED FROM BI_2TE_3 NANODOTS

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CdTe is a compound semiconductor with a wide range on device applications. Promising dispositives such as solar cells and x-ray and gamma ray detectors are currently being developed on this material. But CdTe micro and nanofabrication for such devices are still on a very early stage. For photovoltaic applications it should be interesting to increase the effective surface of interation with the incoming radiation in order to obtain bigger efficiencies, while on high energy radiation detectors, the problem of array formation and pixelation of detectors, is a key for developing a competitive technology. For solving these questions, CdTe whisker formation over CdTe substrates is proposed.

It has been demonstrated elsewhere that Bi doping on CdTe , both in bulk and thin films, increase the photoconductivity of the material and, by controlling Bi concentration, resistivities from 10^5 Ω·cm up to 10^{10} Ω·cm can be obtained, matching for different applications[1,2].

For this, a preliminary study of whisker formation prompted by Bi_2Te_3 nanodrops is presented. CdTe and Bi_2Te_3 have been co-evaporated over glass substrates in a classic CSS (Close Space Sublimation) system. Surface samples present a high density of whisker formation(fig.2). From EDX analysis, it is shown that the whisker's body is CdTe while the drop on the tip is Bi_2Te_3. A mechanism of formation is proposed. Also, Photoluminescence(PL) and catodoluminescence(CL) measurements have been performed on these samples. These hexagonal phase shifts the band gap energy up to 1.63eV, increasing the absorption range of the material. From CL experiments, evidence of CdTe hexagonal phase formation on whiskers' bodies is obtained. PL spectra carried on these whiskers have confirmed the hexagonal phase and also have shown the presence of Bi in the whiskers' bodies.

References:

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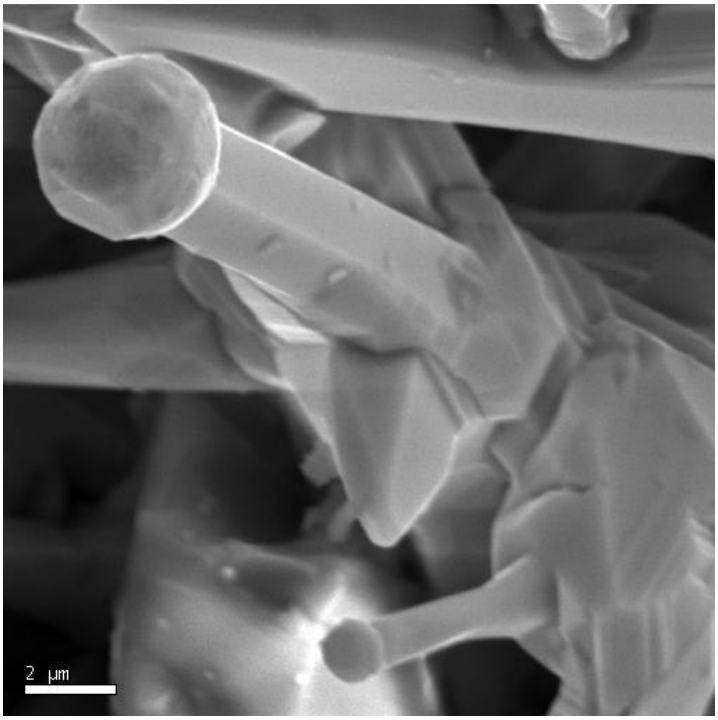
Figures:



CdTe whiskers