

. Indium oxide doped with both tin and zinc (ITZO): high density with highly conducting ceramic targets for sputtering TCO thin-film electrodes.

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Abstract:

Indium oxide doped with tin and zinc (ITZO) ceramics have been prepared by sintering powders mixture, which is embedded in alumina crucible, at 1300 °C. This allowed us to easy fabricate large targets with high density suitable for sputtering TCO films. Without using any cold or hot pressing techniques, The ITZO ceramic reaches a high bulk density (~ 92 % of In₂O₃ theoretical density). XRD diagrams show a high solubility limit for Sn and Zn when they are co-doped into In₂O₃ forming a solid-solution. They confirm a bixbyte structure typical for In₂O₃ with no extra peaks that could correspond to Sn and/or Zn based oxides. A very low electrical resistivity is obtained, for [In₂O₃:Sn_{0.10}]:Zn_{0.10} (1.7×10^{-3} Ω.cm, lower than ITO counterpart), due to high carrier mobility. This high mobility is correlated to the strong enhancement of the grain percolation as shown by SEM micrographs