Combinatorial Approach for Systematic Studies in the Development of Transparent Electrodes

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Abstract : We have demonstrated the combinatorial synthesis of a variety of transparent conducting oxides using a combinatorial sputter system. The effects of a wide range of Nb or Zn doping rate on the optical and electrical properties of Indium-tin oxides (ITO) films were investigated. The Nb or Zn doped ITO films were fabricated on glass substrates using combinatorial sputtering system which yields a linear composition spread of Nb or Zn concentration in ITO films in a controlled manner by co-sputtering two targets of ITO and Nb_2O_5 or ITO and ZnO. We have examined the work-function, resistivity, and optical properties of the Nb or Zn-doped ITO films. Furthermore, the effects of H_2 plasma treatment on the physical properties of Ga or Zn doped ITO films synthesized by combinatorial sputter system were investigated.

Key Words : Combinatorial sputter, TCO, ITO, ZnO