Selection of optimal conditions for deposition of thin IGZO films by PECVD method

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Indium gallium zinc oxide (IGZO) is one of the most promising semiconductor materials as an active layer in Thin Film Transistors (TFT). Thin IGZO films have advantages such as good stability, transparency in the visible range, and high charge carrier mobility [1].

Thin films of indium gallium zinc oxide (IGZO) were obtained by plasma-enhanced chemical vapor deposition (PECVD) [2]. Optimal deposition conditions for these thin films were selected. During the experiments to obtain films of better quality, the following synthesis conditions were varied: the ratio of the starting metals in the alloy and their evaporation temperature, the flow rate of the carrier gas, and the plasma discharge power. The obtained layers have a homogeneous surface structure and a uniform distribution of elements across its area, indicating the applicability of this method for obtaining IGZO thin films. Based on the results of a series of experiments, optimal deposition parameters for IGZO thin films by the PECVD method were determined: 1) Precursors: metallic zinc, indium-gallium alloy (60 at.2) Zn temperature 290 °C, In-Ga temperature 800 °C; 3) Carrier gas flow rate - 4.5 ml/min (0.01 Torr); 4) Plasma discharge power 50 W.

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[2] Mochalov L, Kudryashov M, Prokhorov I, Vshivtsev M, Kudryashova Y, Slapovskaya E and AV K 2023 *High Energy Chemistry* **57**(6) 478–484