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Preparation of Ga_2O_3 Thin Films by Sol-Gel Method—a Concise Review

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Abstract. Nowadays, gallium oxide (Ga_2O_3) as a wide bandgap semiconductor material is acquiring more and more attention in various practical areas. As a result, there has been a lot of efforts to fabricate and study bulk Ga_2O_3 material, Ga_2O_3 thin films, and Ga_2O_3 nanowires. For Ga_2O_3 films, there exists a variety of preparation methods such as metal-organic chemical vapor deposition, hydride vapor phase epitaxy, pulsed laser deposition, molecular beam epitaxy, frequency magnetron sputtering, atomic layer deposition, wet chemistry, and sol-gel. This concise review focuses on the preparation of Ga_2O_3 thin films by sol-gel methods. Sol-gel methods include dip-coating, spin-coating, spray pyrolysis, and drop casting technique. The details on the fabrication of β-Ga_2O_3 thin films by sol-gel method are summarized and prospected. Polymorphism, structure and properties of sol-gel prepared Ga_2O_3 films are discussed.

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