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Sol- gel Synthesis of Ga₂O₃ Nanorods and Effect of Precursor Chemistry on their Structural and Morphological Properties

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Abstract

Synthesis of mono-crystalline Ga₂O₃ Nanorods was done by sol-gel transformation of gallium(III) isopropoxide (Ga(OPrⁱ)₃). XRD studies were done to determine the planes and crystal structure of synthesized nanorods that showed the synthesis of β-Ga₂O₃ (**a**). TEM studies of synthesized Ga₂O₃ confirmed the synthesis of monocrystalline β-Ga₂O₃ nanorods. To study the effect of precursor chemistry and to determine role of precursor structures on the crystal structure, phase and morphology of the Ga₂O₃, a new modified precursor complex was synthesized. The reaction of Ga(OPrⁱ)₃ with N-phenylsalicylaldehyde, [C₆H₄(OH)CH=N(C₆H₅)] in 1:1 molar ratio yielded [{(H₅C₆)N=CH-C₆H₄O}Ga(OPrⁱ)₂]. The newly synthesized complex was characterized by elemental analyses, molecular weight measurement, FT-IR and NMR (¹H and ¹³C) spectral studies. Spectral studies of the modified complex suggest the presence of bidentate mode of attachment of Schiff's base in the solution state. Sol-gel transformations of

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