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TAILORED THIN FILMS FOR OPTICAL WAVEGUIDES AND FILTERS: EXPLORING ATOMIC LAYER DEPOSITED Al2O3, Y2O3, and TiO2-x.

This study explores Atomic Layer Deposition (ALD) for engineering optical waveguides and filters. Al2O3-Y2O3 nanolaminates and Al2O3 thin films were fabricated using ALD, demonstrating their potential as waveguides with low propagation loss. The influence of the oxygen source (H2O vs. O3) in ALD Al2O3 waveguides was investigated, revealing lower losses for O3-based films. TiO2-x films with varying oxygen vacancy content were also explored, achieving a high refractive index (2.55) while maintaining good light propagation. Additionally, O3 annealing was examined for TiO2/Al2O3 multilayer filters, improving optical transmittance and etching resistance. Finally, waveguides were fabricated by ultrafast laser ablation of Al2O3 thin films, highlighting the potential of this technique. These findings showcase the versatility of ALD for creating advanced photonic devices using Al2O3, Y2O3, and TiO2-x materials.

Keywords

optical waveguides, optical filters

Reference

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