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Transparent Conductors for Mid Infrared Liquid Crystal Spatial Light Modulators

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Abstract

Transparent conductors (TCs) are required for liquid crystal spatial light modulators(LC-SLMs) in order to set up an electric field across the LC layer. In the middle infrared (Mid-IR) range ($\lambda = 2$ to $5 \mu\text{m}$), LC-SLMs can offer a low-cost, non-mechanical, random-access and compact alternative to the gimbaled mirrors used currently for Mid-IR laser beam-steering. Indium tin oxide(ITO) is the industry standard for applications in the visible spectrum but it performs poorly in the IR, with a transmittance $< 20\%$ for Mid-IR wavelengths. Little work has been done to develop a comparable material which fulfils the required properties in the Mid-IR: A sheet resistance allowing operation at typical frequencies ($\approx 1\text{kHz}$) and, if patterned, with minimal voltage drop along the electrode, a transmittance $> 50\%$ in

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