Plasmonic Colors: Toward Mass Production of Metasurfaces - DTU Orbit (29/12/2018)

Plasmonic Colors: Toward Mass Production of Metasurfaces

Plasmonic metasurface coloration has attracted considerable attention in recent years due to its industrial potential. So far, demonstrations have been limited to small patterned areas fabricated using expensive techniques with limited scalability. This study elevates the technology beyond the common size and volume limitations of nanofabrication and demonstrates aluminum-coated polymer-based colored metasurfaces of square-centimeter size by embossing, injection molding, roll-to-roll printing, and film insert molding. Different techniques are compared and the requirements and bottlenecks in terms of master fabrication, replication, metallization, and protection coating for large-scale production of sub-wavelength metasurfaces are discussed. Most notably, it is demonstrated that plasmonic metasurface colors are compatible with film insert molding. The results indicate a promising future for plasmonic colors as a viable alternative for decorating mass-produced polymer parts.

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