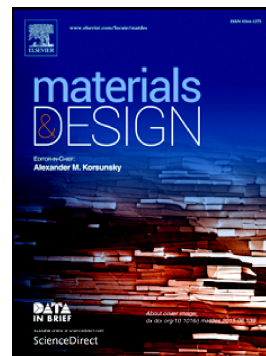


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Article type: Original Article**Solvatochromism based on Structural Color: Smart Polymer Composites for Sensing and Security**

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Keywords: polymer composites, core-shell particles, photonic crystals, stimuli-responsiveness, structural colors

Highlights:

- Large-area transparent photonic crystal (TPC) films of polymer core-shell particles have been engineered with iso-refractive balance of indices.
- TPCs be completely and reversibly switched, between transparency and an intense structurally colored state (10% reflectance), by solvent environment stimuli.
- Cross-linking generates encrypted patterns, revealed via a solvatochromic mechanism, with applications including in sensing and anti-counterfeit security.

Abstract: We report a convenient and scalable strategy to achieve large-area transparent photonic crystal (TPC) films that can be fully reversibly switched between an initial transparent state and a structurally-colored state. This photonic material is based on an ordered colloidal crystal structure of polymer core-shell particles with an engineered refractive index balance of the core and the shell components. Highly transparent viscoelastic quasi-solid films are created that can be spatially UV-cross-linked, giving invisible encrypted photonic patterns with different solvent response compared to non-cross-linked regions, which appear after immersion in solvent media, thus demonstrating clear and fully

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