‘Paintable’ Polymer Photonic Crystals

Scientific Achievement
We demonstrate the rapid self-assembly of brush block copolymers to lamellar nanostructures with photonic bandgaps spanning the entire visible spectrum, from ultraviolet (UV) to near infrared (NIR).

Significance and Impact
This work represents a significant step towards truly paintable polymer nanostructures, enabling an inexpensive route to large-area photonic crystals. These polymers could be developed into NIR-reflective paints to combat the “urban heat island effect” due to NIR photon thermalization.

Research Details
– The brush polymer architecture drastically reduces polymer chain entanglement, facilitating assembly
– The synthetic tunability of this system enables “bottom-up” fabrication of photonic crystals with application-tailored bandgaps


Work was performed at Caltech