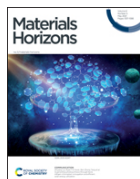


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Issue 5, 2021

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From the journal:

Materials Horizons

The transfer and amplification of cyanostilbene molecular function to advanced flexible optical paints through self-crosslinkable side-chain liquid crystal polysiloxanes†



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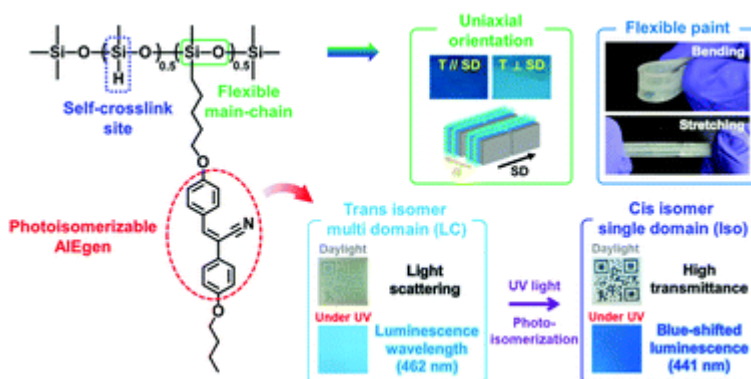
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Abstract

A self-crosslinkable side-chain liquid crystal polysiloxane containing cyanostilbene (Si-CSM) was newly synthesized for the development of a new generation of flexible optical paints. The photoisomerization of the cyanostilbene moiety at the molecular level was transferred and amplified to the phase transition of Si-CSM, resulting in changes in the macroscopic optical properties of the Si-CSM thin film. The self-crosslinking reaction between Si-H groups in the Si-CSM polymer backbone caused the self-crosslinked Si-CSM thin film to be very elastic and both thermally and chemically stable. Therefore, the self-crosslinked Si-CSM thin film endured stretching and bending deformations under relatively harsh conditions. In addition, the uniaxially oriented and self-crosslinked Si-CSM thin film generated linearly polarized light emission. Polarization-dependent and photopatternable secret coatings were fabricated *via* a spontaneous self-crosslinking reaction after coating the Si-CSM paint and irradiating ultraviolet (UV) light through a photomask. This newly developed flexible optical Si-CSM paint can be applied in next-generation optical coatings.



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Article information<https://doi.org/10.1039/D1MH00004G>**Submitted**

02 Jan 2021

Accepted

11 Mar 2021

First published

11 Mar 2021

Citation*Mater. Horiz.*, 2021, **8**, 1561-1569

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