Repairable Cylindrical Microdomains from Block Copolymers Enabled by Photoplastic and Photodielectric Effects

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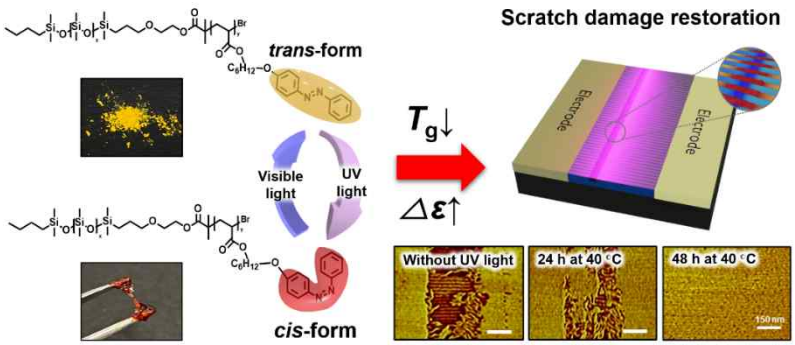
We present a *trans-cis* isomerization in cylinder-forming polydimethylsiloxane-*b*-poly((4(phenyldiazenyl)phenoxy)hexyl acrylate) (PDMS-*b*-PPHA) film that enables the generation of healable arrays over macroscopic distances. The *trans-cis* isomerization by UV light exposure brings about a significant increase in the dielectric constant and a dramatic decrease in the T_g of the PPHA block. Applying these photoplastic and photodielectric characteristics to an *in-plane* electric field, near-perfectly aligned cylindrical microdomains from *cis*-cast PDMS-*b*-PPHA film are obtained at low temperature of 40 ºC. To prevent dewetting of the BCP film at the ambient condition, visible light is exposed to cause *cis-trans* isomerization of the PPHA block, increasing the T_g to 54 ºC. Furthermore, the remarkable damage of 300-nm wide scratches on cylindrical arrays in *trans*-cast PDMS-*b*-PPHA film can be completely healed at 40 ºC upon UV light exposure and sequential electric-field application. [1]



References

[1] H. I. Jeon, S. Jo, S. Jeon, T. Jun, J. Moon, J. H. Cho, H. Ahn, S. Lee, **D. Y. Ryu**, and T. P. Russell, "Repairable Macroscopic Monodomain Arrays from Block Copolymers Enabled by Photoplastic and Photodielectric Effects", *ACS Nano*, 17, 8367-8375 (2023)

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