CREATING ELASTOMER AND HYDROGEL LAYERS WITH SPATIAL VARIATION OF CROSSLINK DENSITY

Jan Genzer, North Carolina State University, USA
jgenzer@ncsu.edu
C.K. Pandiyarajan, North Carolina State University, USA

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We will discuss methodologies that lead to the production of substrates featuring spatial variation of cross-link density in elastomer and hydrogel layers. First, we will demonstrate how to tune the network density in silicone elastomers spatially and gradually by varying the chemical composition of the base materials as well as by employing UV-based crosslinking. We will then present methods that enable tuning the spatial distribution of cross link densities in surface-bound hydrogel layers by utilizing external ultra-violet and temperature triggers applied in an orthogonal manner. The latter approach will then be generalized to demonstrate how to manufacture polymer networks using commercially-available commodity macromolecules without any need for special chemical synthesis.

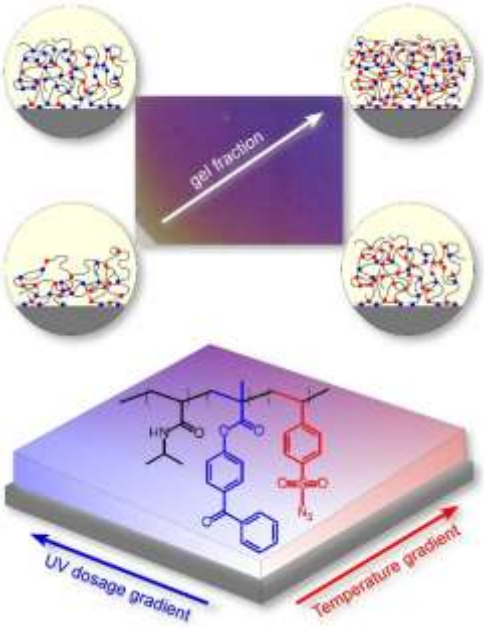

Figure 1 – Surface-attached polyacrylamide gels with gradually and orthogonally varying cross-link density prepared by using photoactivated (benzophenone) and thermally (sulfonyl azide) activated cross-linking chemistries.