# Combined supramolecular and covalent self-healing polymers

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Self-healing polymers featuring multiple healing cycles are of high importance in material design. The current project will address the generation of a self-healing system by combination of two principles of self-healing via encapsulation principles, thus generating self-healing polymers with more than one "self-healing-cycle". Both healing principles (room-temperature based cycloaddition reactions as well as supramolecular-interactions based on hydrogen bonds) will rely on liquid polymers bearing multiple (reactive or associative) functional moieties on their chain-ends. Thus multiarm-star-, dendritic- and graft-polymers will be used as encapsulated (polymeric) reagents, with a glass transition-temperature ($T_g$) significantly below room temperature so as to retain their liquid flow behavior. Multivalency of all interacting or reactive groups is needed in order to increase the crosslinking density and thus the final mechanical strength of the "healed" material. The presented concept will be extended towards the visualization of crack.