A novel strategy for precision network formation based on *para*-fluoro thiol ligation

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In this work, we introduce the para-Fluoro-Thiol reaction (PFTR) chemistry as a new strategy for network synthesis. [1] Due to their light weight and their attitude to be recovered and re-used, polymer networks are an important class of material network which find application in several field such as energy, wastewater treatment and biomedical drug carriers.
Aside the composition, structural imperfections and the degree of cross-linking strongly influence the performance of the material itself.[2] As a consequence, the achievement of ´ideal network´ has recently received significant attention from material scientists.[3] Here, we show how, by designing a novel fluorinated linker, one could tune and introduce selectivity to the reaction during network formation. To assist the elucidation of the PFTR mechanism a model reaction with a monothiol is presented. The versatility of the entire concept is further demonstrated by employing several bifunctional thiols.
In addition, an in-depth analytical characterization of the networks is provided. Especially, X-ray photoelectron spectroscopy (XPS) and time of flight secondary ion mass spectrometry (ToF-SIMS), are suggested as analytical tools for the quantification and confirmation of network formation.

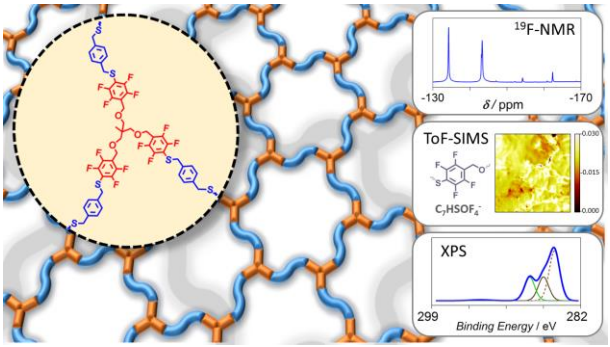

Figure 1: Synthesis of precision network via selective para-fluoro thiol reaction (PTFR) and subsequent analytical investigation via ^{19}F-NMR, XPS and ToF-SIMS.

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