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Synthesis of Covalent Organic Frameworks Containing Structural Linkers with Donor-Acceptor Characteristics and Investigation of Their Optoelectronic and Energy Storage Properties

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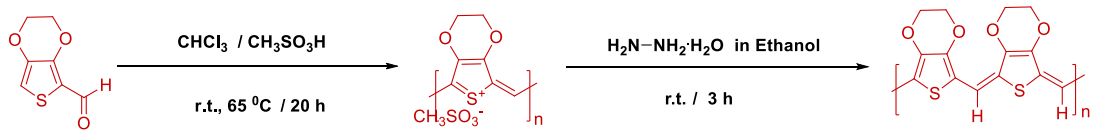
Covalent organic frameworks (COFs) are a class of crystalline organic porous materials.[1,2] While COFs are generally studied for gas storage and catalysis, their optoelectronic and energy storage properties have been explored only recently.[3,4] For example, thiophene-based COFs, synthesized starting from highly conjugated linkers, have shown semiconducting and luminescent properties.[5]

This research aims at synthesizing new conductive COFs based on thiophene moieties. Our target structure is composed by a tritopic linker (i.e. : tris(4-thiophene-2-yl)phenyl)amine) and a series of ditopic linker (i.e. :thiophene-2,5-dicarboxaldehyde and derivatives) linked through a condensation reaction that will define a methine bridge. These materials, containing modulated donor-acceptor moieties, can offer different optoelectronic properties respect to the previous COFs based on boronate anhydride, boronate ester, borosilicate, nitrile, imine, hydrazone and anionic silicate bridges. Poly(EDOT-methine) have been also synthesised (Scheme 1) as reference conducting material based on a thienylmethine bridge.



Scheme 1: Reaction of Poly(EDOT-methine)

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