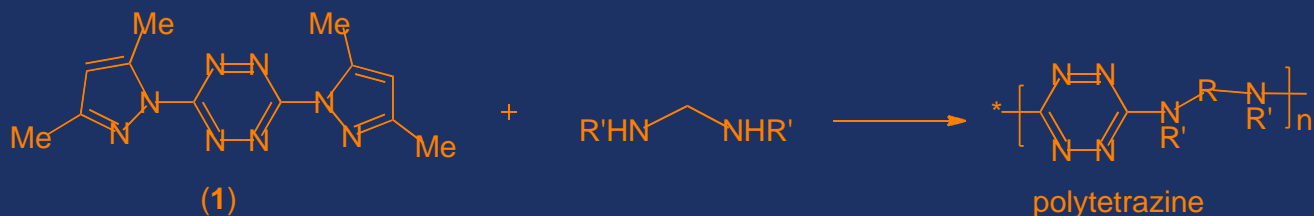


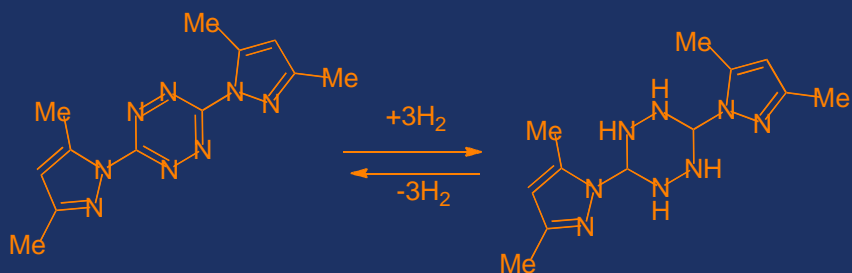
Tetrazine Polymers for Hydrogen Storage

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Reversible hydrogenation of new, tetrazine based polymers will provide safe, non-cryogenic storage of hydrogen for fuel cells.



Our goals were to 1) prepare the first examples of tetrazine-based polymers from 3,6-bis(3,5-dimethyl-1H-pyrazol-1-yl)-s-tetrazine (1) reacting with diamines and dithiols and 2) investigate the hydrogenation/dehydrogenation chemistry of tetrazines. We have added the investigation of the Diels Alder cycloaddition chemistry of tetrazines and pyridazines.



Results:

- 1) Synthesis of tetrazine monomer (1)
- 2) New tetrazines from model reactions of (1) with amines
- 3) Demonstration of the reversibility of tetrazine hydrogenation
- 4) Preparation of the first tetrazine based polymers from diamines
- 5) Demonstration of tetrazine hydrogenation in solid polymers