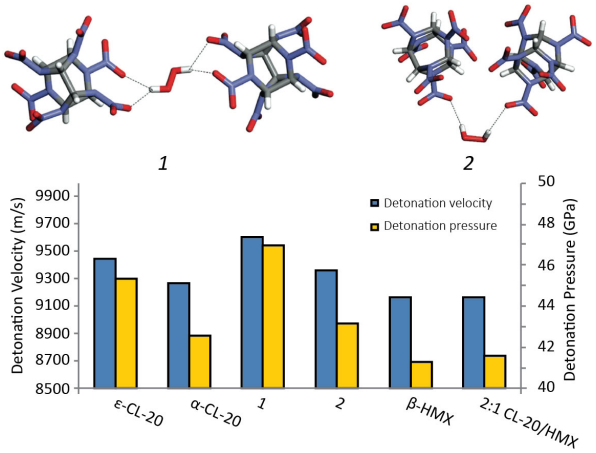
MATZGER GROUP

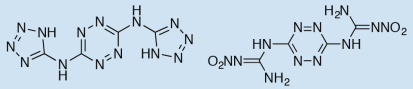
Department of Chemistry
Materials Science and Engineering
http://umich.edu/~ajmgroup/

SOLID FORM ENGINEERING

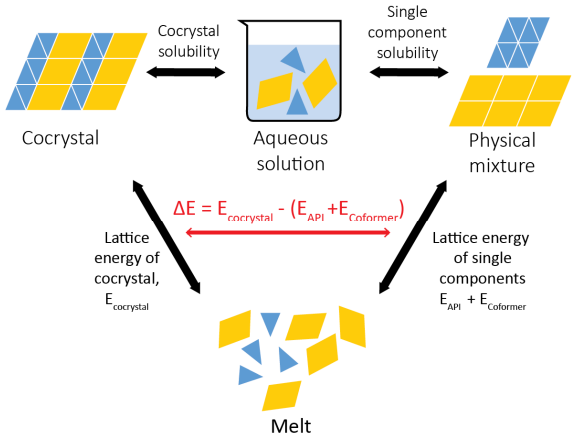
Multicomponent Energetics



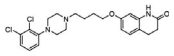
HIGH-NITROGEN ENERGETICS:

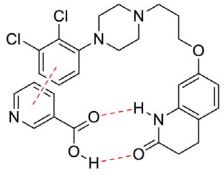


Kinetics vs. Thermodynamics of Nucleation and Dissolution

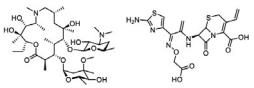


Example Target API: Aripiprazole
BCS Class IV, Marketed as the Anhydrate





Additional API Targets:

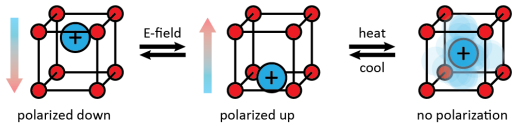


Azithromycin
BCS Class II
Dihydrate

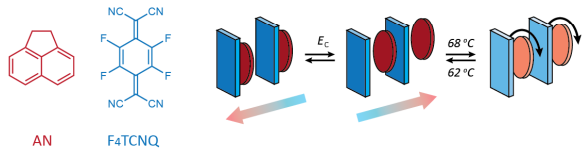
Cefixime
BCS Class II
Trihydrate

Electronic Cocrystals

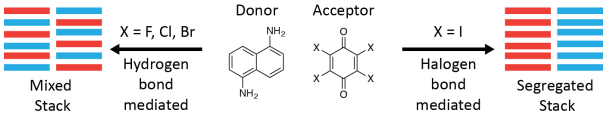
Inorganics:



Organics:



Intraplanar Interactions



GOALS

Design and synthesize multicomponent energetics to understand the favorable interactions that can be utilized for reliable control over performance

Develop polymer-based methods for the study, discovery, and selection of polymorphs, cocrystals, and solvates and apply these systems to pharmaceuticals

Develop noncentrosymmetric charge transfer cocrystals for applications in data storage, second harmonic generation, and transducers

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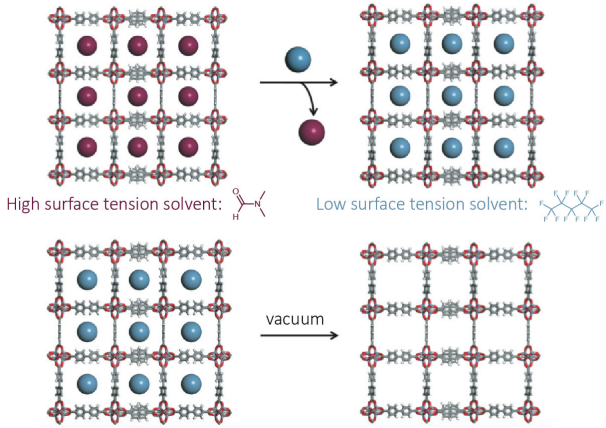
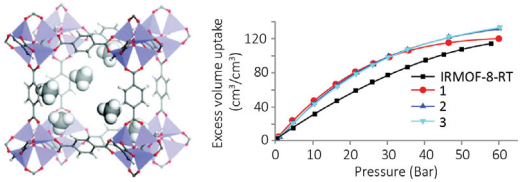
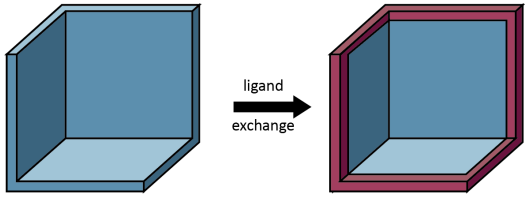
SYNTHESIS AND CHARACTERIZATION OF COORDINATION POLYMERS

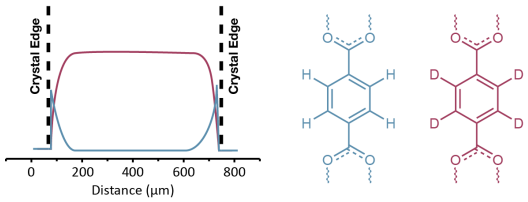
Guest Removal and Storage

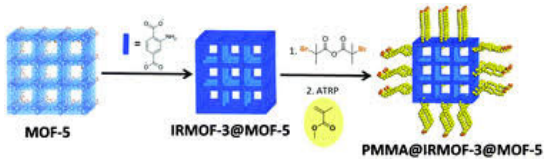




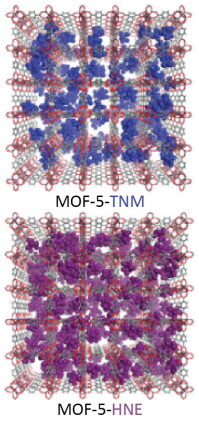
Core-Shell Morphologies

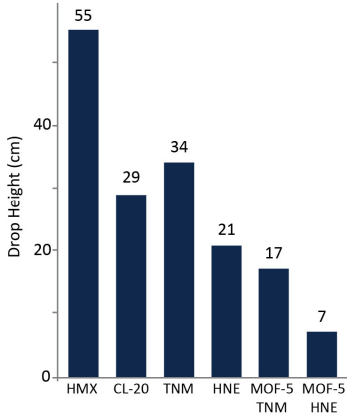


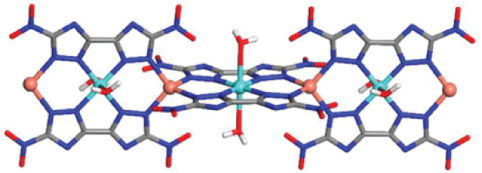




Energetic Polymers







GOALS

Develop highly porous, high surface area materials and apply these materials in gas and large molecule adsorption, small molecule separation, and catalysis

Elaborate strategies towards post-synthetically modified MOF structures to alter hydrolytic stability and guest adsorption selectivity

Alter the performance of energetic materials through the formation of fuel-oxidant composites and increased packing density