**Motivation**

- Commodity chemicals can be synthesized from oxygen-rich biomass.
- Separations may account for 50-70% of the production costs.
- We propose that a zeolite membrane process may be able to replace one or more of the separation steps.

**Objectives**

**Use adsorption to protect HMF from further reaction**

**Develop structure-property correlations for polyol adsorption**

**Experimental Method**

- Adsorption isotherms are first step in designing separation process.
- Single component adsorption study was done on various zeolite to study the adsorption behavior.

**HMF Adsorption Results**

- Adsorption isotherms are first step in designing separation process.
- Single component adsorption study was done on various zeolite to study the adsorption behavior.
- Effect of competitive adsorption was also studied for MFI (Si/Al ~ ∞) using both experiment and theory Ideal Adsorbed Solution Theory (IAST).

**Conclusions**

- It is shown using adsorption isotherms that HMF and furfural are preferentially adsorbed over sugars on various zeolite frameworks.
- K_{ads} values indicate that polyol adsorption is strongly dependent on dispersion forces which are a function of the adsorbate carbon number, adsorbate –OH number, and zeolite pore size. The chemical composition of the zeolite only has a marginal effect.
- These results could contribute to the advancement of technologies for the processing of biomass to chemicals and fuels.

**References**