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DIRECT CONVERSION OF METHANE TO METHANOL OVER COPPER-EXCHANGED OMEGA ZEOLITE (MAZ)

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Project Summary: Direct conversion of methane to methanol is a promising technique to utilize stranded methane that is otherwise flared due to the heavy economic burden of its transportation. This thesis explores this conversion through stepwise processes over copper-exchanged zeolites. First, a zeolite synthesis approach is taken to understand which factors affect this important conversion, where minute changes in the synthesis procedure were observed to greatly affect the methanol yield. Furthermore, different procedures for methane to methanol conversion were evaluated and characterized: high temperature activation and isothermal conversion. With the optimized synthesized parent zeolite, Cu-omega zeolite was found to be one of the highest methanol yielding zeolites even under isothermal conditions. These improvements in material and process conditions represent a step forward towards scaling up and industrial applicability.

CV. Amy received a dual BA/BS in Chemistry from Colorado College and in Earth and Environmental Engineering from Columbia University and then an MS in Civil and Environmental Engineering from Stanford University. Prior to starting her PhD, she worked for 4 years as a research and analytical scientist for Imerys S.A. in their filtration and performance minerals division.