# Dynamics and Control of Benzene Hydrogenation via Reactive Distillation

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This project seeks to develop a fundamental understanding of, including approaches to influence, the dynamics of reactive distillation columns in which competing reactions are taking place. One important representative case for this type of reaction/separation process is the hydrogenation of benzene via reactive distillation. Removal of benzene from a reformate stream is one of the key steps in the production of gasoline, as the EPA has classified benzene as a carcinogen, thus necessitating its removal before distribution. However, since there are competing reactions taking place in addition to the separation, the dynamics exhibited by reactive distillation columns are non-trivial and frequent periodic disturbances in the reformate stream cause the process to deviate from its desired operating conditions for a significant portion of the time.

**Figure Legend:**

**Comparison of equipment needed for reactive distillation and conventional separation/reaction for benzene hydrogenation**