

Catalysts and catalytic process for the transformation of alkytrans for petrochemical applications

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PhD Program: Sustainable Chemistry

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Introduction

Due to the continuous depletion of petroleum sources, and the increasing need for energy and transportation fuels, new type of oils sources and petroleum fractions have been explored and processed.

Alkytrans, commonly used for specific applications in construction and pavements, are one of these possible fuel sources.



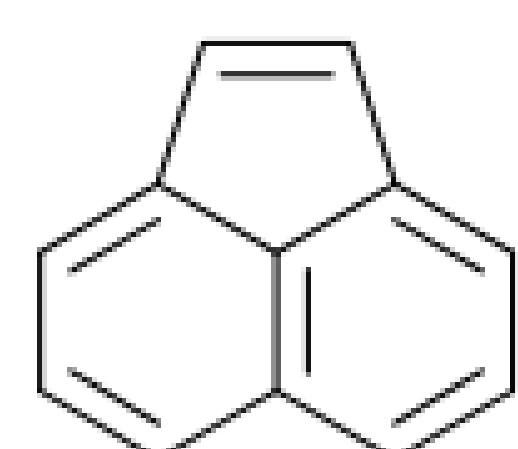
Petroleum distillation or refining



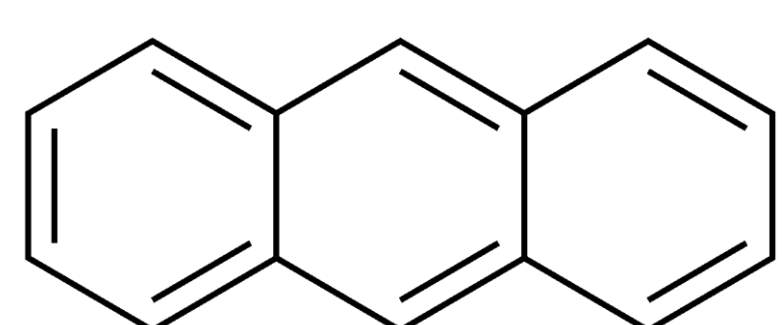
Gasification of wastes



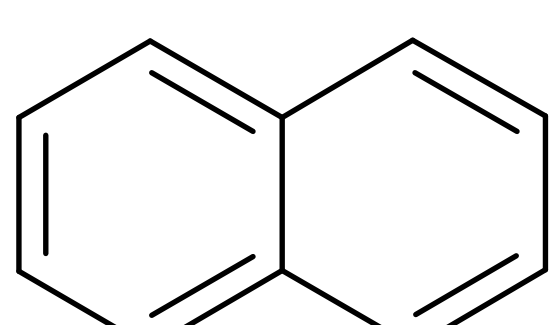
Some representative components of alkytrans



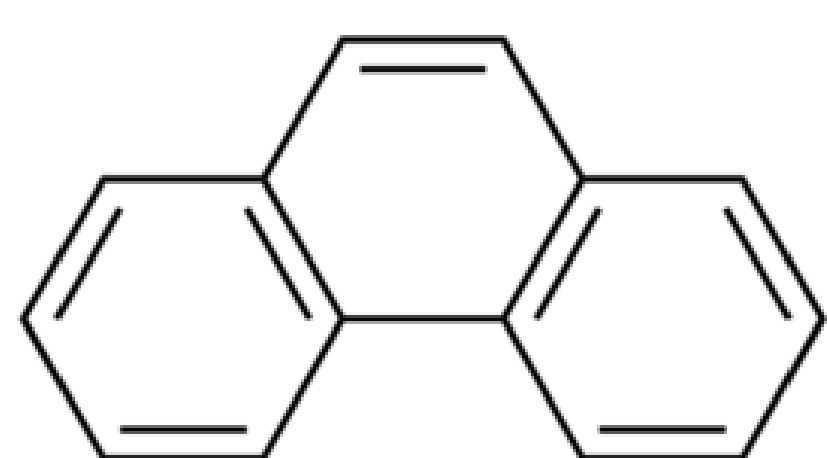
Acenaphthylene



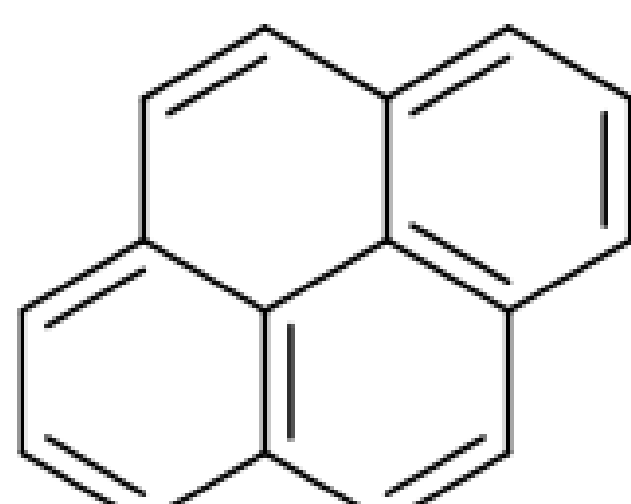
Anthracene



Naphthalene



Phenanthrene



Pyrene

Main Objective



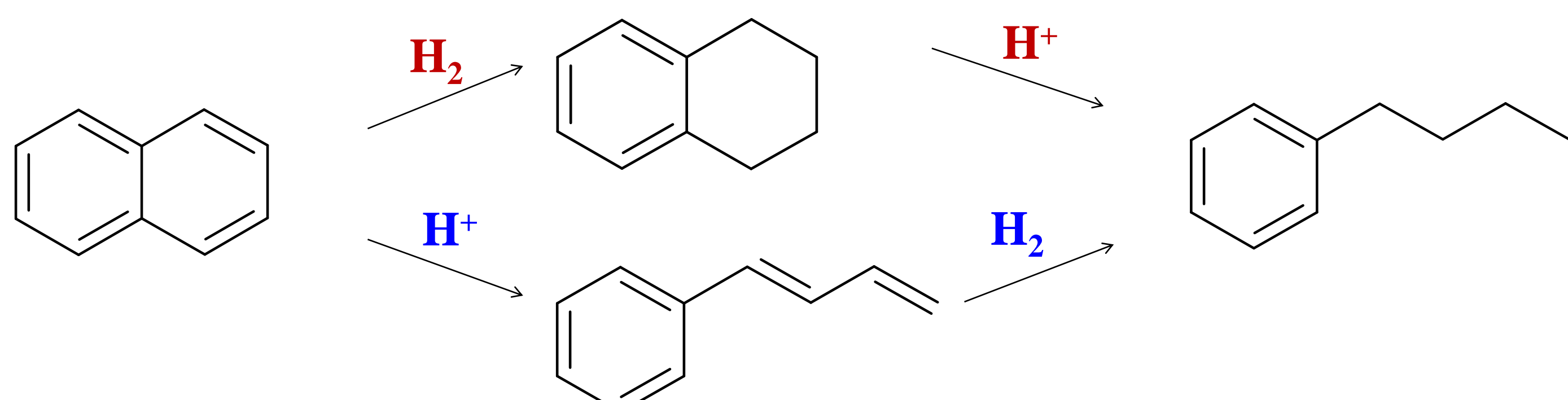
Transformation and valorization of alkytrans fractions derived from petroleum refining and/or urban residues thermal treatments into valuable chemical products and fuels by using *catalytic hydrocracking process*

To accomplish this main goal novel multi-functional and highly resistant solid catalysts will be designed and developed in this study

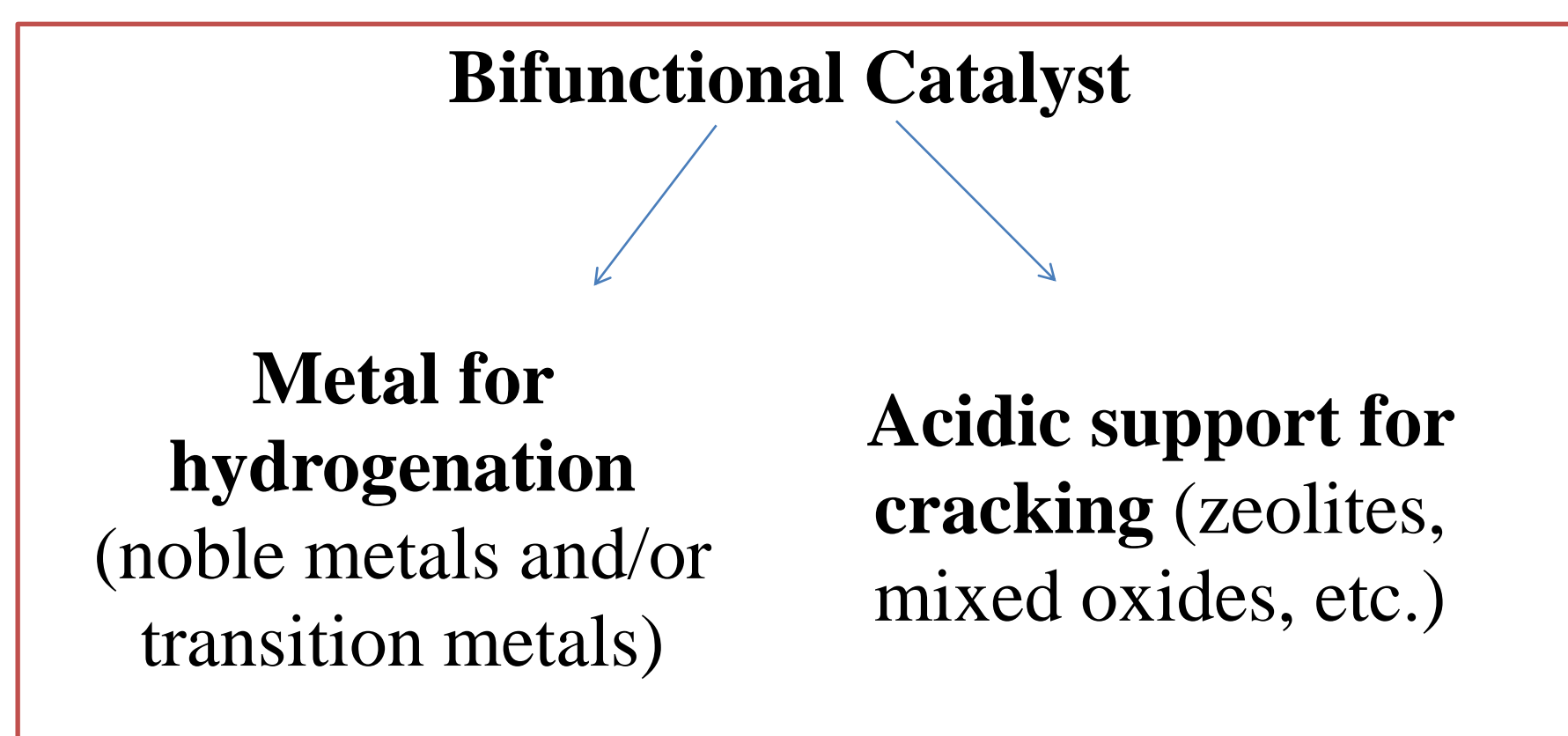
Catalytic Hydrocracking Process

Catalytic Hydrocracking → Hydrogenation + Cracking

a) Hydrogenation + Cracking (Metal/Mixed oxides)



b) Cracking + Hydrogenation (Metal/Zelites)



Expected Results

Development of novel multi-functional solid catalysts able to transform alkytrans derived from petroleum refineries and even from gasification of municipal solid wastes into valuable products with industrial interest, and application of these catalysts in Hydrocracking processes.

Our big interest is to synthesize a catalyst having these properties:

- Cheap
- Easy to prepare
- Having high surface area
- High resistance to poisoning
- Good activity for hydrogenation and cracking
- Good selectivity for cyclic, aliphatic and branched hydrocarbon products in the range of C₁₀-C₁₅
- Working at moderate temperature and H₂ pressure
- Good stability for a long time

Acknowledgments

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Catalytic Experiments

Catalytic hydrocracking reactions are carried out in a 12 ml autoclave-type reactor with PEEK interior, equipped with a magnetic bar, pressure control and a valve for either liquid or gas sample extraction. Reactor is placed over a steel jacket individual support connected to a heater programmer to control the temperature required. Liquid samples were analysed by GC-FID and products were identified by GC-MS

