

## Mansour Al Herz

### Enantioselective Hydrogenation In Fixed-Bed Reactor

#### Mansour Ali Al-Herz

BEng Chemical Engineering

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Industrial sponsor: Saudi Aramco

Mansour Al-Herz is a PhD student in the Chemical Engineering Department. He was born in Saudi Arabia, where he received a Bachelor degree with honours in Chemical Engineering at King Fahad University of Petroleum & Minerals in August 2004.

He completed summer training with Schlumberger in 2003, in the area of Reservoir Evaluation Wireline. He joined Saudi Aramco (my sponsor) during his University years through the CDPNE program in 2003.

In 2003-2004 the American Institute of Chemical Engineers (AIChE) awarded him the first prize for designing a methanol plant with a target capacity of 2500 tons per day. Mansour has a background in heat exchanger design and corrosion.

He is now working on enantioselective hydrogenation at the Chemistry-Chemical Engineering interface. Some objectives of his project are:

- Testing different reactions and catalyst combinations to find the best conditions for optimization of enantioselectivity in specific catalytic processes.
- Optimize catalyst formulation for chosen reactions (temperature, solvent and hydrodynamic conditions) and characterize the catalyst surface produced.
- Optimize reaction conditions and select and optimize suitable reactor design for the reaction
- Measurement of single and multiphase flows to determine the flow patterns and mixing patterns in the reactor.
- Optimization of mixing and mass transfer between gas and liquid using particle image velocimetry (PIV).
- Reaction studies in trickle bed reactor under controlled conditions.

Trickle-bed reactors are multifunctional reactors occupying an important position in the industry. They are widely used in petroleum, petrochemical, wastewater treatment, pharmaceuticals, pesticides, herbicides, biochemical industries.

Catalytic, multiphase hydrogenation has been conducted for over a century and surprisingly most of the reactions accomplished via this process are carried out in just one reactor type which is the stirred tank reactor.

The trickle bed reactor is a well-established alternative used in large-scale chemical industries although there are some difficulties to scale up. Mansour successfully conducted some reactions in trickle bed reactor and further studies are underway in order to optimize and scale up. Mansour enjoys sharing knowledge with other researchers in the group.

