Southwest Catalysis Society

Fall Symposium Series

Thursday Nov. 16, 2017 @ University of Houston
Reception/Dinner: 6:00 – 7:30 PM
Seminar: 7:30 – 8:30 PM

Boron-based catalysts for the oxidative dehydrogenation of small alkanes

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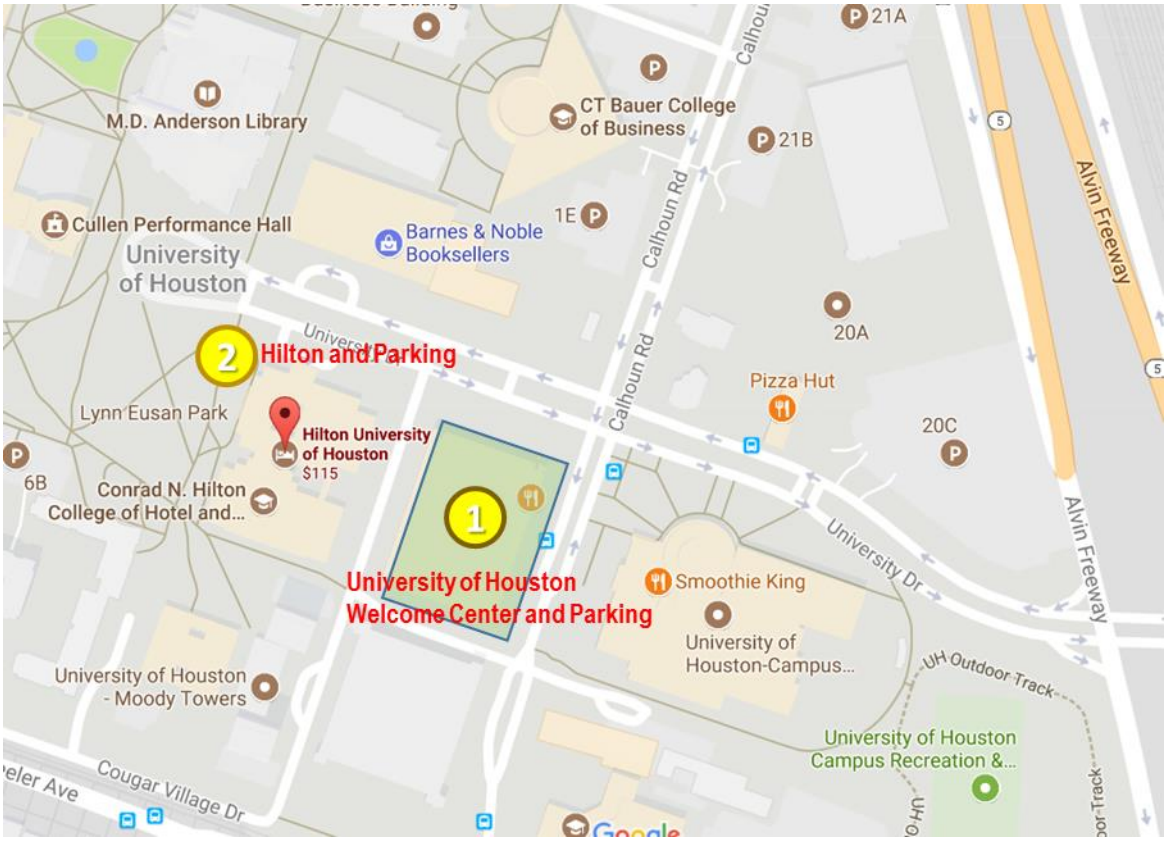
The recent availability of low-cost natural gas feedstock is transforming the petrochemical value chain. While efficient utilization of ethane in steam crackers has led to process improvements in ethylene production, it has come at the cost of lowered propylene and butylene supplies. Thus, 'on-purpose' olefin production technologies must be developed to meet the growing demand for these important building block molecules. One such process, the oxidative dehydrogenation (ODH) of small alkanes, improves on process inefficiencies of non-oxidative dehydrogenation methods used in industry today. However, even after decades of work on ODH, selectivity to olefins remains too low for industrial implementation. The lack of kinetic control to limit the amount of overoxidized CO_x byproducts identifies the need for the discovery and development of alternative materials to better control partial oxidation chemistry.

Here, we report that several boron-based materials such as hexagonal boron nitride, boron carbide, titanium diboride, and elemental boron, amongst others, all possess remarkably high selectivities towards propylene during the ODH of propane, exceeding the performance of metal oxide-based catalysts. The comparable catalytic activity of these boron-containing materials suggests the presence of a common active site that is unaffected by the presence of heteroatoms. These active surface species are formed by the oxidation of surface boron atoms under reaction conditions as evidenced by various characterization techniques.

Location: **Hilton, University of Houston**
Registration: $15 Students/Postdocs, $30 Member, $50 Non-member

University of Houston Map: Parking and Event Location



1. **Parking garage:** 4400 University Drive, Houston, TX 77204
2. **Reception/Dinner/Seminar:** Hilton Hotel