Hydrogenation of N over Fe{111}

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Abstract

Over the past five decades, ultra high vacuum (uhv) techniques applied to well-defined single-crystal samples (the "surface science paradigm") have transformed our understanding of fundamental surface chemistry. To translate this success to the world of realistic heterogeneous catalysis, however, requires one seriously to address the fact that real heterogeneous catalysts usually operate under near-ambient or higher pressures. Nevertheless, the surface science paradigm can undoubtedly provide crucial insights into catalytic processes, so long as care is exercised in the design of experiments. Forging a secure link between two radically different pressure regimes is the major challenge, which we illustrate here with reference to the vitally important ammonia synthesis reaction, achieved industrially only under extremely high pressure.

Author keywords

Auger spectroscopy; Catalytic ammonia synthesis; Surface chemistry

Indexed keywords

EMTREE drug terms: ammonia; ferric ion; nitrogen; potassium; ammonia; iron

EMTREE medical terms: adsorption; atmosphere; atom; Auger electron spectroscopy; catalysis; catalyst; chemical reaction; crystal structure; desorption; dissociation; high temperature; hydrogenation; molecular recognition; priority journal; review; science; surface property; synthesis; article; catalysis; chemistry; hydrogenation; methodology; physical chemistry; pressure; spectroscopy; vacuum

MeSH: Ammonia; Catalysis; Chemistry, Physical; Hydrogenation; Iron; Nitrogen; Pressure; Spectrum Analysis; Surface Properties; Vacuum

Medline is the source for the MeSH terms of this document.