Hydrogenolysis without Hydrogenation of Polynuclear Aromatic Hydrocarbons

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This is a difficult catalytic problem in coal liquefaction. I propose a novel approach based on the extensive work carried out over the past five years by Tamaru and collaborators at the University of Tokyo. In this work, Tamaru has shown that charge transfer complexes obtained by combination of an electron donor with an electron acceptor frequently possess marked catalytic activity for reactions involving the activation of dihydrogen. Under identical conditions, the electron donor and acceptors have no such activity when taken separately, but the EDA (electron donor acceptor) complex does.

An example which I believe to be of interest for coal liquefaction is the EDA formed by coevaporation of anthracene and sodium vapor. The solid produced in this way is active in a number of reactions, and there is convincing evidence that dihydrogen, as it dissociates, reacts with the aromatic system at low temperature.