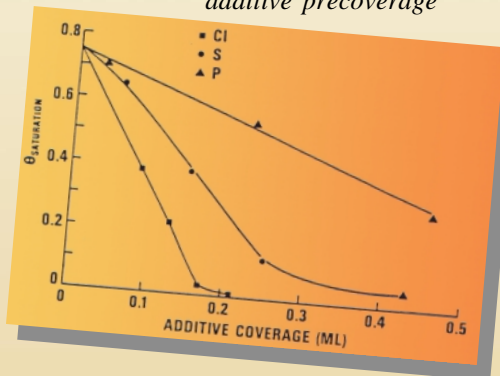


4th Decade: 1979 - 1988

20

Dependence of total H_2 adsorption on additive precoverage



1980's: Introduction of SCR (Selective Catalytic Reduction) for NO_x control on stationary power generators.

1980's: New catalytic technology commercialized in the U.S. during the 1980's (J. Armor, Appl. Catal., 78, 141 (1991)).

1980's: Union Carbide and Shell develop the UNIPOL process for linear low-density polyethylene, which allows precise control over the product's material properties. The process was extended to polypropylene in 1985.

1980's: Demonstration that strongly electronegative elements relative to nickel modify chemisorptive behavior far more strongly than a simple site-blocking mechanism would allow, supporting an electronic effect (D. W. Goodman, "Chem. Phys. Solid Surf," Springer-Verlag, 1986, pp. 169-195).

20

1980's: Experimental evidence demonstrating the restructuring of surfaces during catalytic reactions - e.g., the conversion of ethylene to ethynylene with expansion of the metal atoms around the carbon atom (R.J. Koestner, M. A. Van Hove and G. A. Somorjai, Surf. Sci., 121, 321 (1982) and showing the parallel restructuring of Pt and oscillation in CO oxidation (G. Ertl, Ber. Buns. Phys. Chem., 90, 284 (1986)).

1980: Very rapid ethene polymerization by homogeneous catalyst ($CP_2Zr(CH_3)_2$ activated with cocatalyst aluminoxane) (H Sinn et. al., Angew. Chem., 92, 396 (1980)).

1981: Applied Catalysis begins publication with B. Delmon as Editor-in-Chief.

1981: Adsorbate induced restructuring of surface (M.A. van Hore et.al., Surf. Sci., 103, 190, 218 (1981))

1981: Introduction of constraint index as a diagnostic test for shape selectivity using cracking rate constants for n-hexane and 3-methylpentane (V. J. Frilette, W. O. Haag and R. M. Lago, J. Catal., 67, 218 (1981)).

1982: Definition of Energy Profile for Ammonia Synthesis (G. Ertl in "Solid State and Material Sci.", CRC Press, 1982, 349).

1982: The first of a series of silicaaluminophosphate molecular sieves prepared by Union Carbide (now part of UOP)

21

1982: The concept of transition state selectivity for zeolite catalysis introduced (W. O. Haag, R. M. Lago and P. B. Weisz, J. Chem. Soc., Farad. Disc, 72, 317 (1982)).

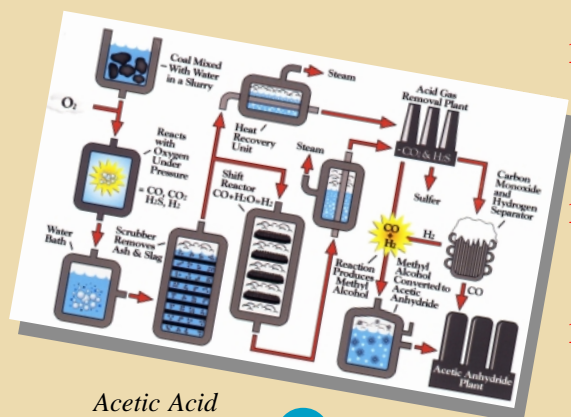
1983: Ashland Petroleum introduces RCC (Reduced Crude Cracking) with 40,000 blb/day plant.

22



E. Flanagin worked on a series of silicaaluminophosphate molecular sieves prepared by Union Carbide.

21



Acetic Acid Flow Diagram

23