Abstract

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OXO ALCOHOLS

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"Oxo" products are the generic term for chemicals manufactured from oxo-chemistry; that is, the hydroformylation of olefins by using syngas (H_2/CO).

$$RCH{=}CH_2 + CO + H_2 \rightarrow RCH_2CH_2CHO$$

Common catalysts for the hydroformylation of olefins are Rh and Co. Rh is almost exclusively used with P-containing ligands (phosphines or phosphites). Co is used most commonly as the carbonyl (CO ligands).

This report deals with a subset of oxo-products—the C_4-C_{10} alcohols derived from the aldehydes produced by hydroformylation. These alcohols can be produced either by direct hydrogenation or by hydrogenating the dimers formed from aldol condensation of lower aldehydes.

Dominant technologies in the butyraldehyde-derived alcohols field are the Rh-catalyzed technologies of Union Carbide Corporation (UCC)/Kvaerner and Celanese. Exxon's cocatalyzed technology dominates iso-nonyl and iso-decyl alcohol manufacture.

SRIC's analysis suggests that the Union Carbide/Kvaerner technology has only a slight production cost advantage over the Celanese water-soluble Rh/phosphine process. However, the UCC/Kvaerner technology does appear to have lower capital costs, primarily because of lower pressures and liquid flows in the hydroformylation process than those in the Celanese process.

Exxon's Co-catalyzed process for iso-nonyl alcohol, which competes with 2-EH in PVC plasticizer manufacture, appears to have an appreciable cost advantage over processes for 2-EH manufacture.

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