

BISPHENOL-A PLANT YIELD ENHANCEMENT

ABSTRACT

An improved process is provided for producing bisphenol-A (BPA) comprising steps of (1) contacting benzene and a C₃ alkylating agent, e.g. propylene, isopropanol or propyl chloride, under alkylation conditions with an alkylation catalyst in a reaction zone to produce an alkylation effluent comprising cumene; (2) oxidizing the cumene from step (1) to produce the corresponding hydroperoxide; (3) cleaving the hydroperoxide from step (2), to produce product comprising phenol and acetone; (4) reacting acetone with a stoichiometric excess of phenol under acidic conditions, possibly in the presence of a cocatalyst or promoter, e.g. a thiol compound, to form a reaction product stream comprising crude bisphenol-A product, unreacted phenol, possibly unreacted acetone, possibly cocatalyst or promoter, water of condensation, and other reaction byproducts; (5) distilling in single or multistage the reaction product stream from step (4) to distill off a volatilized unreacted phenol stream, possibly an unreacted acetone stream, possibly a stream containing cocatalyst or promoter if present in step (4), and the water of condensation, while sending downstream to a BPA- phenol adduct crystallization and purification step, said purification step comprising one or more solid-liquid separation and wash steps, the resulting concentrated BPA phenolic feed stream consisting essentially of phenol in which the bisphenol-A and byproducts have been concentrated; (6) producing BPA- phenol adduct crystals by crystallization of the concentrated BPA phenolic feed stream in said crystallization, solid-liquid separation and wash steps with cooling for said crystallization by vaporization of an alkane hydrocarbon or mixture of hydrocarbons containing from 4 to 6 carbons, e.g. pentane; (7) separating the BPA-phenol adduct crystals by solid-liquid separation, such as, for example, by centrifugation or filtration, and washing same in one or multiple stages with a wash phenol stream which may include at least a portion of the volatilized unreacted phenol stream recovered from step (5), or spent wash or mother liquor from subsequent crystallization, solid-liquid separation, and wash steps, to produce final washed BPA-phenol adduct, final spent wash and final mother liquor; (8) cracking a stream comprising at least a portion, for example from about 0.5 to about 20 wt.%, preferably from about 1 to about 10 wt.%, more preferably from about 2 to about 7 wt.%, of said final mother liquor of step (7) in a reactor with basic or acidic cracking catalyst, for example caustic or aluminum chloride, under cracking conditions selected to recover a product comprising from about 60 to about 90 wt.% of said portion of said mother liquor stream as phenol having a purity level of from about 95 to about 100 wt.%, and from about 10 to about 40 wt.% of said cracked stream as heavy residue byproduct; and (9) recovering and feeding the phenol product of step (8) to step (4) and/or step (7).

NO FIGURE