

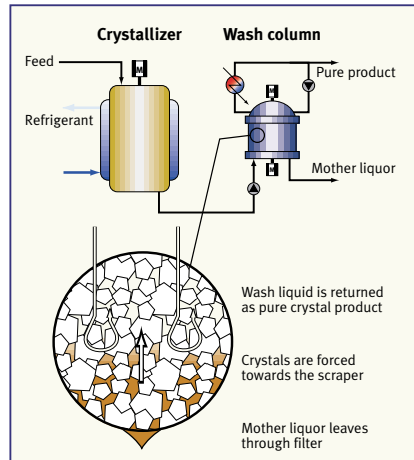
An efficient route to ultra-pure organics

Niro has developed an innovative melt crystallization process that maximizes the efficiency with which crystals are recovered and washed

Melt suspension crystallization is a well-known purification technique, with the attractive feature that a single crystallization step is all that is necessary to produce 100% pure crystals from a eutectic system. The process is especially attractive for separating isomers, azeotropes and other close-boiling compounds, for temperature-sensitive substances and wherever high purity is important.

Ultra-pure product, however, can only be achieved by completely removing the pure crystal from the impure melt. Conventional mechanical separations require intensive washing of the filter cake with melted product to achieve even moderately-pure product. The unique Purifier technology developed by **Niro Process Technology BV**, on the other hand, provides complete solid-liquid separation with final purities of 99.9+% and no consumption of product as wash liquid.

The process operates by cooling impure feed product to produce pure crystals in a crystallizer (see diagram). This slurry of pure crystals and impure mother liquor is then fed to the bottom of a wash column, where most of the liquid leaves through a



In the Purifier process developed by Niro Process Technology BV, suspension crystallization and separation in a wash column combine to produce ultra-pure organics. The process is used on a large scale to produce *p*-xylene

filter. Compressing the slurry removes as much liquid as possible.

The compressed bed, composed of pure

crystals and surrounding impure melt, is then forced through the column towards a scraping device at the opposite end. As the crystals are forced through the Purifier they pass through a zone of pure wash liquid where they are countercurrently washed with melted product.

The wash liquid recrystallizes as it warms the cold crystals up to the melting temperature of the pure component, so all the wash liquid is recovered as new crystal product. The washed bed is scraped off at the top and fluidized with melted product, and the final purified product is withdrawn from this melt loop.

Niro has over 100 Purifiers in commercial service, with capacities from a few kg/h to several m.t./h. Notable is its application in world-scale *p*-xylene plants, in conjunction with crystallization technology developed by the Washington Group (formerly Badger). Niro and Washington have also formed an alliance with UOP to apply the technique to UOP's PX-Plus™ and HySorb™ technologies, giving purities of 99.9+%, high recovery and lower utility consumption than any competing process, says Niro. www.niro-pt.nl