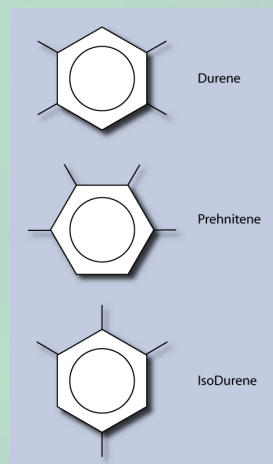


Application

Durene (1,2,4,5-tetramethylbenzene) is used as a solvent and as an intermediate for manufacturing pyromellitic acid, which is used for the fabrication of curing agents, adhesives and coating materials. Durene is used for manufacturing raw materials of specialty heat resistant engineering plastics (polyamides) and as a cross-linking agent for alkyd resins.

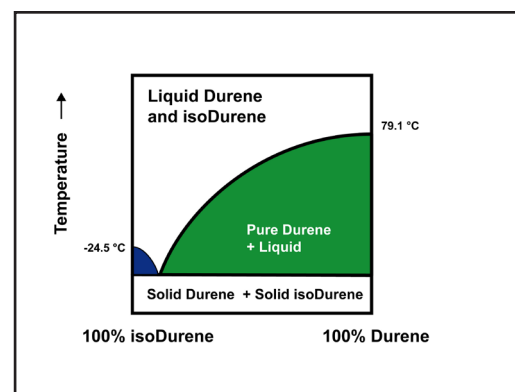
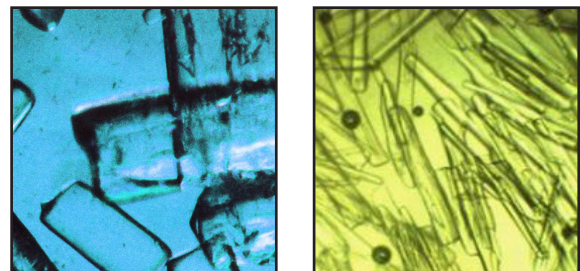
Durene can be isolated from the other isomers of tetramethylbenzene prehnitene and isodurene by means of crystallization. Using melt crystallization and separation by GEA Messo PT, a durene product with purity over 99,5% can be obtained. Single stage operation has been proven successful by means of conducting extensive pilot plant testing with durene.

The phase diagram for a solution of durene and isodurene is shown at the right. Suspension crystallization provides near ideal crystal growth conditions and an efficient separation of these ultra-pure product crystals ensures the purity of the final product.



Ultra Purification of Durene

Suspension Crystallization with Wash Column Separation



Process Engineering / GEA Crystallization

GEA Messo PT

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Features

High product purity – Durene purity >99.5%

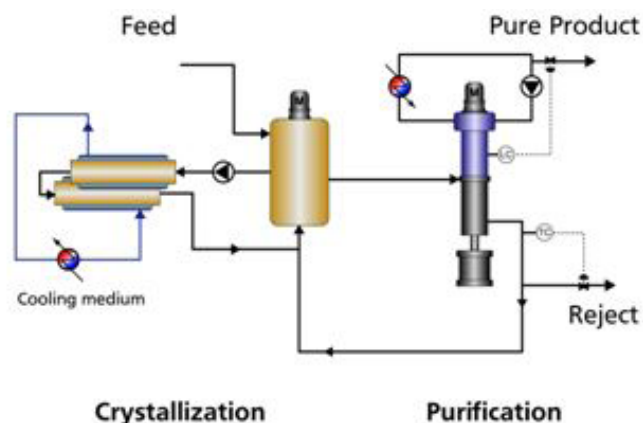
Feedstock – Operates on a range of feed stocks with the variations in feed impurity composition being absorbed by the system.

Economics – Due to the single crystallization step required by suspension based systems the operating costs are significantly lower than other separation techniques.

Furthermore, the efficient separation in the GEA Messo PT purifier ensures no loss of wash liquid, increasing production capacity by 10 to 20% compared to centrifuges. Because of the low rotating speed and the robust construction of the GEA Messo PT purifier, maintenance costs can be virtually neglected. GEA Messo PT can provide assistance in determining the optimum configuration and cost information for your specific circumstances.

Process Description

The melt crystallization process is carried out in an industrially proven scraped surface crystallizer where final purification is completed in the GEA Messo PT purifier. The feed product is cooled inside the crystallizer where part of the product is converted into pure crystal solids leaving the impurities concentrated in the residual mother liquor.



The crystallizer consists of a jacketed vessel with a rotating scraper assembly. Refrigerant evaporates in the outer jacket and cools the inner wall of the vessel.

The scraper sweeps the wall surface and prevents build-up of crystals to maintain a clean heat transfer surface and continuous supply of product crystals.

Each individual crystal provides growth surface that can absorb the supersaturation caused by cooling the product at the swept surface. With billions of individual crystals present, this will provide near ideal growth conditions and ensure the production of ultra-pure crystals.

The GEA Messo PT purifier completes the separation of this mixture of pure product crystals and residual mother liquor. The purifier is based on GEA Messo PT's patented wash column technology and is an essential component in this purification process.

The crystal slurry is compressed within the GEA Messo PT purifier to remove most of the mother liquor and form a packed crystal bed. This bed consists of the pure product crystals surrounded by some residual mother liquor. The new crystals entering the purifier will force the bed toward the scraper assembly at the opposite end. The scraper disintegrates the crystal bed and a circulation pump provides melted product to reslurry the crystals.

The circulation flow carries the crystals to a heat exchanger where steam provides the heat necessary to melt the crystals. The melted product can then be discharged to product storage.

The melted product in the recirculation stream counter currently washes the residual mother liquor from the packed crystal bed as it moves through the purifier. The length of the crystal bed provides an extremely efficient wash zone for removal of any remaining impurities in the mother liquor ensuring ultra-pure product. Unlike other solid/liquid separation devices operating with a much shorter bed depth, the wash liquid forms an internal reflux loop and is therefore recovered as recrystallized product in the melt circuit instead of leaving with the mother liquor.

Experience

GEA Messo PT is a technology oriented engineering company with over 30 years experience in the design and execution of crystallization plants worldwide. We started by crystallizing water from liquid food products in 1973 and since then have built and installed over 100 purification units around the world including applications for water, PX and PDCB.

New developments in process technologies pose new challenges every day which require innovative and low-cost solutions. Practical orientation and customer requirement play a vital role in this connection. GEA Messo PT consistently orientates itself towards the needs of the customer. GEA Messo PT has been certified according to DIN ISO 9001 standard since 1996 and since June 2003 the new ISO 9001:2000 standards were implemented following an audit by the international bureau Lloyd's Register Quality Assurance.

Next Steps...

On-site demonstration of this technology is possible in various configurations from 3 kg/h up to 300 kg/h using one of GEA Messo PT's pilot plants. For more information regarding this technology and your specific configuration requirements please contact us at: info.niropt.nl@geagroup.com or phone +31.736 390 390.