

## GEA Niro Suspension Crystallization with Wash Column Separation

### New system obtains ultra-pure explosives

#### **Application**

The GEA Niro suspension based melt crystallization process with wash column separation exhibits some distinct advantages that favor its application over competitive technologies. Incentives to apply this process for highly explosive substances include:

#### **Purity:**

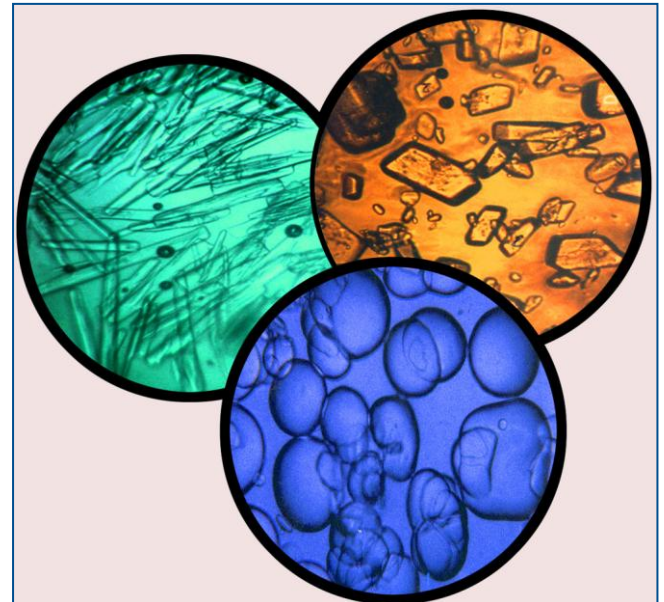
Very high purities (99.9+%) are typically attained in eutectic systems.

#### **Safety:**

The process is operated at the lowest possible operating temperatures assuring minimum thermal and chemical activity. The complete process is run in a closed, pressurized system without the presence of a vapor phase, thereby minimizing the risk of decomposition.

#### **Energy:**

It is a continuous process with the heat of crystallization being 1/3 to 1/7 of the heat of evaporation. Energy savings compared to layer crystallization are substantial. The utility consumption of a GEA Niro process is typically between 2 to 10 times lower than the layer option, depending on how many stages are necessary for the latter technology. The savings result from the fact that the product is crystallized only once. Against that the layer process is commonly repeated a couple of times to achieve acceptable product purities. Also the heating up and cooling down of the complete steel of the installation adds up significantly to the energy consumption of a discontinuous layer process.



#### **Example case**

Together with the German Degussa AG, successful pilot plant test for the purification of hydrogen peroxide have been performed. Since hydrogen peroxide has a high energy content and decomposes to water and oxygen it is used as an oxidizer/propellant for aircraft rockets in space technology. Process safety has been the mayor incentive for Degussa when they decided to investigate the GEA Niro technology for their application in more detail. At an impurity level in the crystallizer of 15 wt% purification ratios between 300 and 3000 have been achieved. During the tests hydrogen peroxide was produced at concentrations between 99.9 wt% and 100 wt% and at a surprisingly low amount of other impurities usually under or close to the detection limit of the individual components. The high efficiency of the wash column separation becomes apparent when comparing this with "normal" centrifuge separation. Wash column separation was typically a factor 10 better than conventional centrifuges.

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