New catalyst geometry poised to re-shape the ethanol-to-ethylene conversion process

# The shape of things to come

As chemical manufacturers continue to seek renewable alternatives for fossil-fuel feedstocks, bio-based ethanol is poised to be a crucial raw material in the ethylene value chain for products from jet fuel to bioplastics.

Various novel-shaped alumina catalysts developed by the BASF Catalysts Division in Ludwigshafen, in Germany, is enabling 99.5% conversion and >95% selectivity for the ethanol-to-ethylene (E2E) conversion process.

## Expanding range

Normally, heterogeneous catalysts are offered in tablets or cylindrical extrudates.

BASF is expanding its existing range of E2E alumina catalysts with the addition of a new star-shaped variant – CircleSta$^{rTM}$.

The fins of the star maximise the active geometrical surface area for the reaction.

Another advantage is that the packed density in the bed, which is correlated with a maximised geometrical surface area, is significantly lower, impacting the overall cost optimisation of the reaction.

Furthermore, the novel geometry correlates to a longer catalyst lifetime because the shape provides a benefit on reaction operation temperature and the pressure-drop profile.

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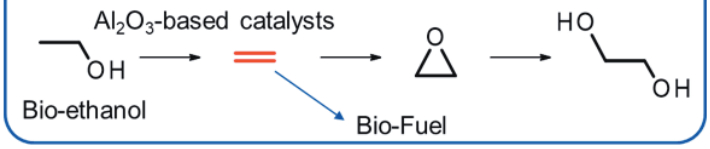
**Chemistry**




In a gas-phase process, pressure drop is key, as well as the optimisation of the temperature inside the catalyst reactor bed, which is also affected by the shape of the catalyst.

Currently, the new catalyst is undergoing a series of pilot trials with selected BASF customers, with a full commercial launch expected sometime in the second quarter of this year. The final application of the bio-based ethylene can be multiple, such as bio-fuel or bio-polymers.

**For more information:**
Visit: catalysts.basf.com

BASF's plant in Ludwigshafen, Germany