CATALYTICALLY ENABLED LOW-TEMPERATURE BLEACHING OF COTTON

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THE TECHNOLOGY
At Catexel we brought our Pegasus catalyst for low-temperature bleaching of cotton to market in 2010. The catalyst is highly effective and is now used by cotton manufacturers on three continents.

Traditionally, cotton is bleached at high temperatures (95-100 °C), at high pH, and using surfactants and hydrogen peroxide. The goal, chemically, is to degrade the colour-causing chromophores found naturally within the cotton, such as morin (see Figure 1). This process will take approximately one hour and the harsh conditions cause some loss in degree of polymerisation of the cotton, reducing yields.

Pegasus is a manganese based catalyst (see Figure 2), originally designed for laundry detergent. The catalyst activates hydrogen peroxide under alkaline conditions, enhancing its activity. This activation enables cotton to be bleached at lower temperatures and in reduced time. Only very small amounts of Pegasus (micromolar levels) are required to achieve the desired results, meaning, with the reduced energy and time, that cost neutrality or even cost savings can be achieved. Crucially, the catalyst causes no damage to the cellulose fibres, in fact the milder conditions reduce damage, increasing yields.

KEY BENEFITS
- Up to 10% cost reduction vs. traditional processing
- Improved yields, by up to 2%
- Softer fabric feel
- Less creasing and pilling in finished cotton

THE RESULTS
With the introduction of Pegasus, bleaching temperatures can be reduced to 78 °C and the time to 38 minutes (see Figure 3). Furthermore, the milder conditions have a number of added, secondary benefits such as softer fabric and less creasing.

WHO ARE CATEXEL?
Catexel is an expert oxidation catalysts company that has developed unique technology platforms based on iron and manganese compounds for use in global manufacturing. We have a library of more than 3000 catalysts, originally developed for laundry detergent, but applicable across a wide range of different industries and applications.

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