

Abstract Title: Haldor Topsoe's Advances in Catalysts for Hydrocracking Pre-treatment and ULSD Production

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Now, more than ever, refiners are forced to search for the absolute top tier NiMo catalyst for their medium to high-pressure ultra-low sulfur diesel or hydrocracking pretreat units. Despite tremendous improvements in the catalyst technology within the past couple of decades, ultra-low sulfur fuel legislation and the shift towards maximizing diesel production from VGO hydrocracking pose new challenges.

Topsoe has developed the TK-611 HyBRIM™ and TK-6001 HySwell™ catalysts for hydrocracking pretreatment and ultra-low sulfur diesel production. The combination of the catalysts enables refiners to obtain maximum aromatic saturation, resulting in increased volume swell and higher operating profitability.

The key to boost the aromatic saturation, lies within removal of nitrogen from the feed, since nitrogen limits both aromatic saturation, density reduction, and volume swell. The TK-6001 HySwell™ is developed specifically for this purpose. When used in hydrocracking pretreatment and ultra-low sulfur diesel applications, the TK-6001 HySwell™ catalyst is able to remove 99,9% nitrogen from the feed, making it possible to achieve a significant increase in volume swell and the amount of low sulfur diesel produced.

TK-611 HyBRIM™ is a cost-efficient, alumina-based catalyst with the highest possible activity. In fact, TK-611 HyBRIM™ offers 25% higher HDS and HDN activity than its successful predecessor TK-609 HyBRIM™, which has been sold to more than 160 units worldwide. Since the introduction in 2016 TK-611 HyBRIM™ has been sold to 45 units, both hydrocracking pretreat and ultra-low sulfur diesel applications.

For the optimal balance of hydrogen consumption, the TK-6001 HySwell™ catalyst should in industrial applications be utilized in combination with the TK-611 HyBRIM™ catalyst.

The presentation will include the catalyst development steps of the new hydrotreating catalysts TK-611 HyBRIM™ and TK-6001 HySwell™, as well as present case stories from units running with these catalysts, showing significant optimized performance