

ELIMINOx

A second-generation non-platinum carbon monoxide combustion promoter

Catalytic oxidation

For more than 30 years, platinum-based combustion promoters have been utilized in FCC units to catalyze the oxidation of carbon monoxide (CO) to carbon dioxide (CO₂) (Figure 1). Albemarle's KOC CO oxidation promoters are produced by a method that uniformly distributes platinum across the surface of a specially designed alumina support. The addition of CO combustion promoter immediately begins to bring the temperature of the dense bed phase and the dilute phase into balance. The better the dispersion of platinum, the more effective the coke combustion.

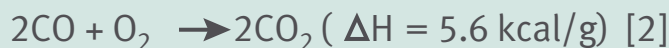


Figure 1: Why use a combustion promoter? During the combustion of carbon, the second reaction can be slow and occur in the dilute phase, cyclones and flue lines and thus result in afterburn.

NO_x formation

When platinum-based CO combustion promoters are added, the oxidation of HCN, NH₃ and other reduced nitrogen intermediates to NO is increased. In addition, the amount of gas-phase reductants (such as CO) decreases, thus reducing the amount of CO available to react with NO. In summary, the use of platinum-based CO combustion promoters leads to an increase in NO_x formation (Figure 2).

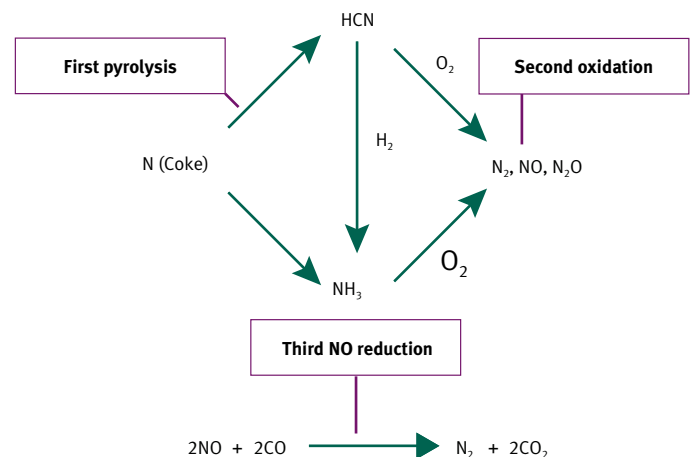


Figure 2: NO_x chemistry in an FCC unit.

A platinum-free solution

Albemarle's new, second-generation, non-platinum CO combustion promoter, ELIMINOx, is a material that effectively controls CO emissions and afterburn without increasing NO_x emissions, unlike conventional platinum-based additives. While they were effective at reducing CO and controlling afterburn, first-generation non-platinum CO combustion promoters were susceptible to activity retention problems. Loss of metals dispersion due to agglomeration occurred, while pore collapse of the support gave rise to surface metal encapsulation. As a result, the effective half-life of first-generation non-platinum promoters was shorter than that of conventional platinum-based promoters, which led to increased product usage.

Improved hydrothermal stability

ELIMINOx overcomes these problems by virtue of a support with improved hydrothermal stability and higher metals loading. ELIMINOx maintains Albemarle's unique bimetallic design for efficient CO oxidation without concern for poisoning by sulfur-containing molecules.

Combustion of carbon

Regeneration of spent FCC catalyst begins in the dense phase of the FCC unit by burning carbon (coke) in air to CO. The subsequent oxidation to CO₂ can be slow and occur in the dilute phase, cyclones and flue gas lines, which results in afterburn that can cause metallurgical damage. In FCC units with poor air and/or catalyst distribution, afterburn can be a major operating constraint. The standard procedure for offsetting the rise in dilute phase temperature caused by afterburning is to reduce the

temperature of the dense bed phase. This leads to incomplete combustion and an increase in carbon on regenerated catalyst, which will lower conversion.

With the ongoing fight for cleaner air and tighter restrictions on emissions, why not let ELIMINOx control your afterburn problems and reduce NO_x emissions at the same time?

Packaging

ELIMINOx is available in 1-kg and 2.5-kg moisture proof bags, 20-liter pails, drums or bulk.

For more information on this or other Albemarle products and technologies, please contact your Albemarle representative.

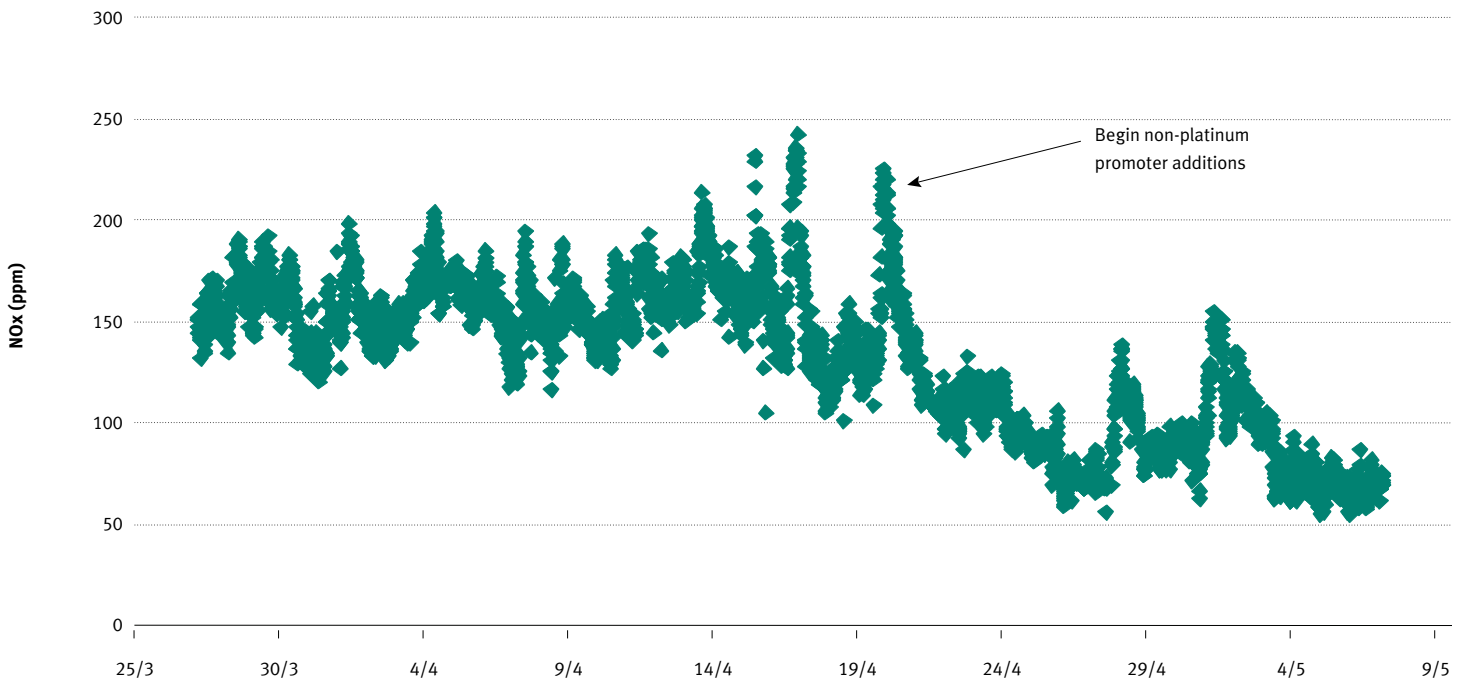


Figure 3 shows the commercial effect of ELIMINOx.

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