



Industrial Management of Fuel Impurities

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in the Oil and Gas Industry

About UOP

For nearly 100 years, UOP has been the leading international supplier and licensor for the petroleum refining, gas processing, petrochemical production and major manufacturing industries.

As a respected pioneer, we are responsible for developing and implementing some of the most useful, original technologies in the world.



- **Commercial grade fuels typically have regulatory specifications**
- **Natural gas and diesel must meet specs to go into product pipelines**
- **Product impurity specs vary geographically**
 - CO₂, sulfur species and odorant levels in natural gas
 - Level of sulfur in diesel
- **Production of commercial grade fuels is well understood and there are many technology providers worldwide**
- **Hydrogen production technology will influence fuel selection**

- **Reforming**

- Used to transform a fuel with a high H/C ratio into a hydrogen stream and a stream with a lower H/C ratio
- Use group VIII metal catalysts that are deactivated by sulfur
- Sulfur speciation depends on fuel source

- **Natural Gas (Steam – Methane) Reforming**

- Reduction sulfur beyond pipeline NG spec is needed
- Technology exists and readily available
- Adsorbents
 - Activated alumina, 13X commonly used in NG purification
 - ZnO and other adsorbents used to remove sulfur at high temperature

- **Steam-Methane reforming results in the production of CO as well as hydrogen**
- **CO is a big poison for fuel cells**
- **Hydrogen purification**
 - PSA is used to remove CO, CO₂, and N₂ from H₂
 - UOP is one of the world leaders in Hydrogen PSA
 - Selective oxidation of CO to CO₂ is another means of removing CO
- **Sulfur is typically not a problem because the reforming catalyst will usually scavenge sulfur containing species**