

Monitoring Vanadium Oxytrichloride (VOCl₃) by a UV / VIS diode array spectrophotometer

Vanadium oxychloride is used as an olefin-polymerization catalyst and in organovanadium synthesis as well as in the production of EPDM rubber. Vanadium oxytrichloride is blended with titanium tetrachloride to form CAB a catalysts for polyethylene production

Vanadium oxytrichloride is a bright yellow liquid. It fumes when left in an open container and must be kept under a blanket of inert gas to keep it from reacting with the moisture in the air. VOCl₃ hydrolyzes upon contact with any form of water (including water vapor in the air) forming vanadic acid and hydrochloric acid as well as VOCl₂ (solid). The effects of exposure to VOCl₃ are similar to the effects of exposure to chlorine, but may be more pronounced.

The toxicity and the sensitivity of the Vanadium Oxytrichloride makes it very difficult to measure under ordinary conditions. Hence, a continuous on-line monitoring in a moisture free environment is required eliminating the need to collect samples on a routine basis.

The UV absorbance spectrum of Vanadium Oxytrichloride is shown in Figure 1. The high absorptivity of the vanadium oxytrichloride allows for accurate and stable monitoring of the VOCl₃ by a UV absorbance technique.

A UV / VIS diode array spectrophotometer is utilized for this application. The complete spectrum is measured and analyzed via a multi wavelengths routine to continuously give the concentration of the VOCl₃.

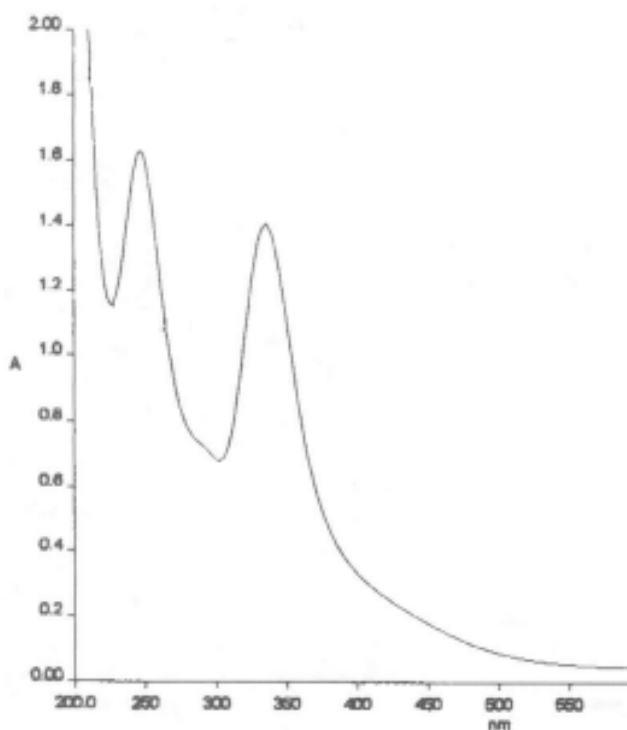


Figure 1: absorbance spectrum of VOCl₃, 1ATM, 25°C, 5cm path length, 4% VOCl₃



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