

Fiberoptical Infrared Spectroscopy for the Chemical Plant

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Fiberoptical spectroscopy makes it possible to move the analytics to the process, rather than vice versa. Examples are shown to illustrate the potential of inline spectroscopy for chemical processes.

Near infrared spectroscopy permits a wide variety of monitoring tasks. It may well be the most widespread spectroscopy for process monitoring in industry.

UV-vis spectroscopy is helpful wherever color or UV absorption is an indicator for the systems' state, e.g. with transition metal redox catalysts. Both catalyst preparation and its use can be monitored in-situ with UV-vis fiberoptical devices. Vanadium pyrophosphate catalyst preparation, and its use for butane oxidation to maleic anhydride, may serve as examples.

Mid infrared allows still more intricate assignments to structural features from the spectra. In one application, the N-alkylation of methyl imidazol is monitored with a mid-IR probe. The same probe also helps in characterizing the continuous set-up in terms of RTD (residence time distribution) determination.

The presentation will illustrate with selected examples what issues need to be resolved prior to obtaining valuable results. Coupling issues, calibration and deconvolution as well as interpretation of the findings will be addressed.