



Diffuse Reflectance Infrared Fourier Transform Spectroscopy (DRIFTS)

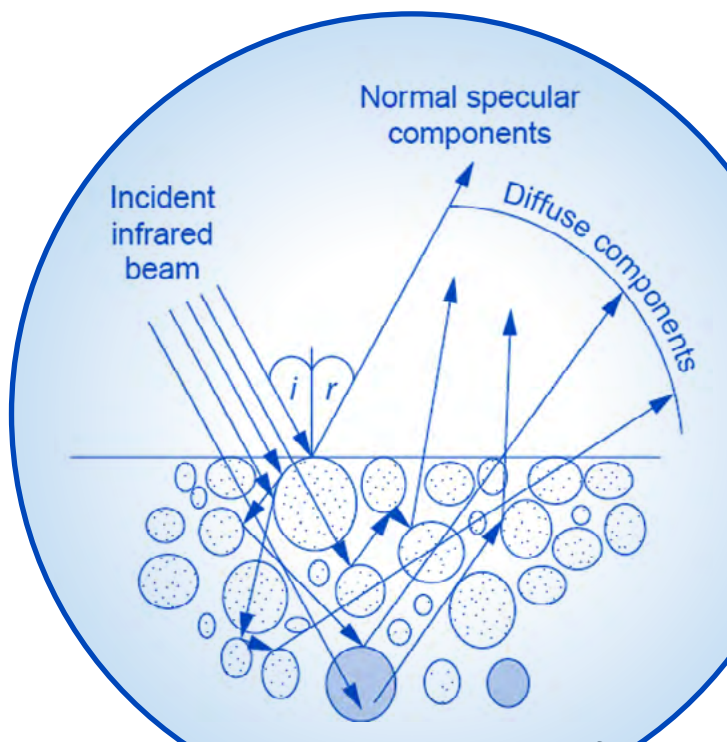
Southwest Research Institute[®] (SwRI[®]) utilizes a method of Diffuse Reflectance Infrared Fourier Transform Spectroscopy (DRIFTS), an infrared technique used on powder samples that is ideal for catalyst surface research. DRIFTS allows evaluation of non-transparent, highly absorbing materials to detect subtle changes on rough surfaces, designed to minimize reflection losses. Understanding surface chemistry is crucial for catalyst innovation and determining modifications that will produce enhanced performance. With DRIFTS, this surface information is attainable.

Advantages of DRIFTS

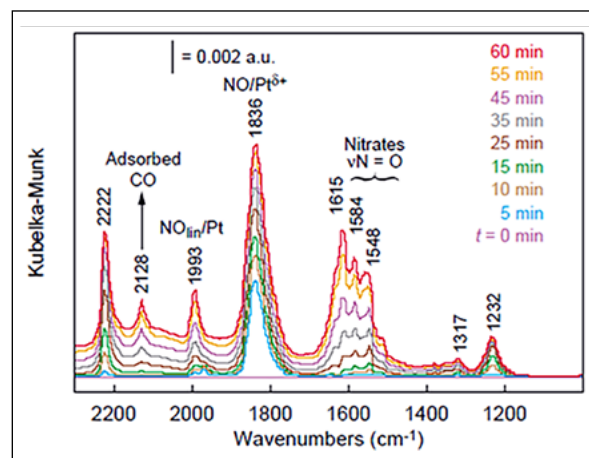
- Sample preparation is effortless
- No sample manipulation required – sample morphology and surface properties are retained
- Ability to evaluate non-transparent, highly absorbing materials
- Samples are not compressed – good gas contact with the entire sample
- DRIFTS gives better signal to noise ratio
- *In-situ* measurements
- Spectra is recorded at elevated temperatures and pressures
- Provides quantitative analysis of surface species

DRIFTS Application

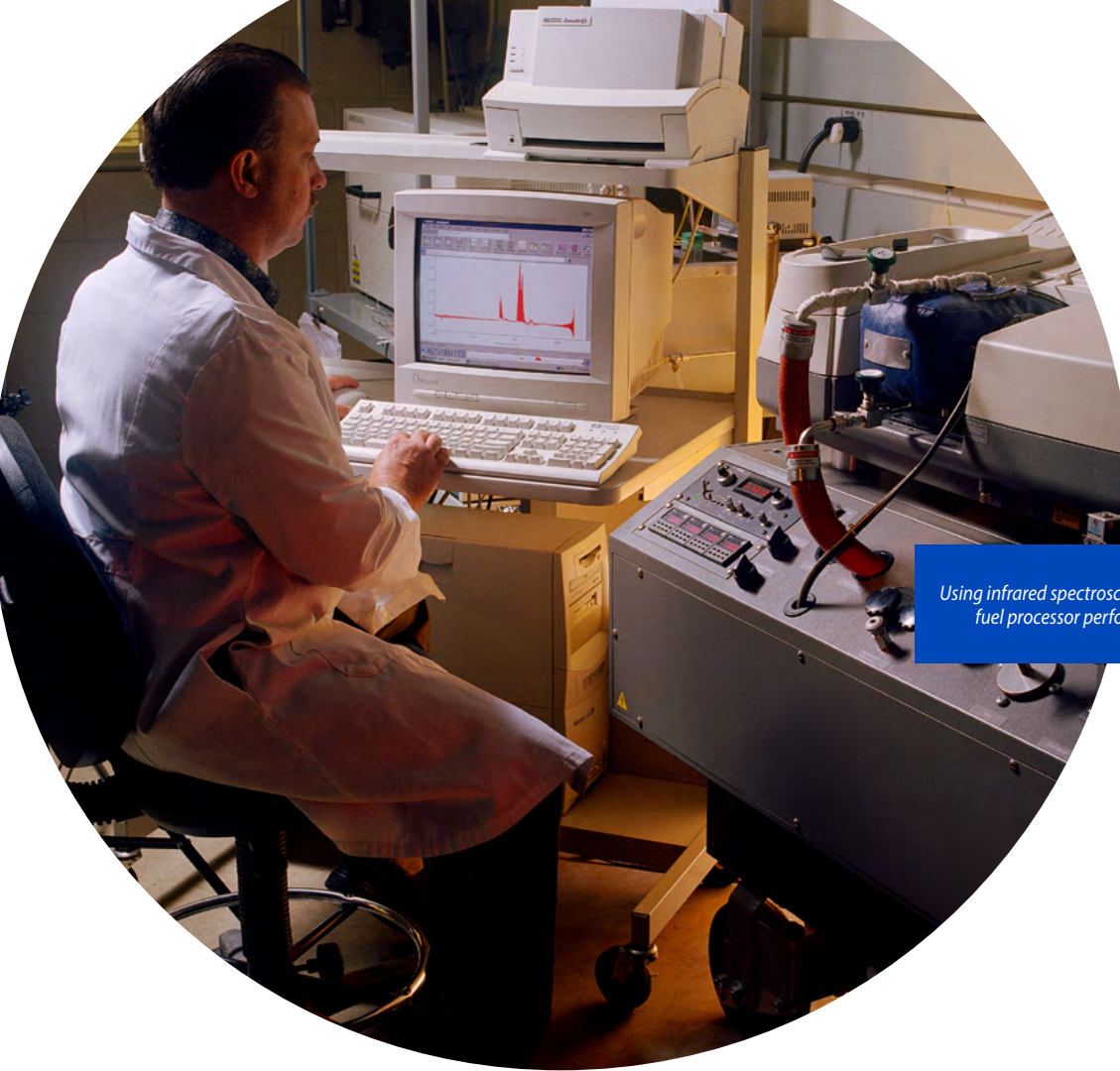
- Provide insights into fundamental mechanisms and reaction pathways to better manipulate catalyst chemistry and engineer unique applications
- Provide analysis of poisoned or degraded catalyst samples to elucidate mechanisms of aging and decomposition
- Improve light-off of catalyst materials by identifying low temperature inhibitors to catalytic emissions reduction



The direct reflected and diffuse reflected infrared (IR) goes into the Fourier transform infrared spectroscopy (FTIR) creating a spectra.



Example spectra of nitration for one hour at 150°C over Pt/Alumina catalyst showing various species adsorbing on the catalyst surface over time.



Using infrared spectroscopy, Institute engineers evaluate fuel processor performance and system design.



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