



ESDU-SPA-M10-2

Apr.09: Probing into petroleum heat-exchanger deposits with spectroscopic imaging

Unamended
Issued October 2010

**Imperial College
London**



Probing into Petroleum Heat-exchanger Deposits with Spectroscopic Imaging

Feng H Tay and Sergei Kazarian

CROF Meeting April 2009

ATR-FTIR spectroscopic imaging of deposits



- Minimised the effects of dispersion in IR for high refractive index materials in ATR spectroscopy by a lab-made aperture to ensure that spectra are free from artefact for a reliable spectral interpretation
- Using the macro and micro ATR accessory, FTIR images yield information about chemical structure and spatial distribution of different components (asphaltenes, carbonates, sulphates, sulfoxides, oxalates and possibly coke) in real heat exchanger deposits
- Applied ATR-FTIR imaging technique to *in situ* high temperature heating of crude oil (200 °C). Compositional change of crude oil observed which may indicate onset of fouling

Tay, F. H.; Kazarian, S. G., Study of petroleum heat-exchanger deposits with ATR-FTIR spectroscopic imaging. Energy and Fuels, **2009**, *submitted*.