

Eltron's Comprehensive Oil Quality Sensor

Eltron Research & Development has developed a proprietary sensor technology that can be used in conjunction with a Raman spectrometer to evaluate engine oil and other fluids. This technology allows for a more detailed profile of engine oil than has ever been available before from a single device. Plus, it can be run on off-the-shelf hardware, allowing it to be easily, cost-effectively applied in a variety of industries.

The Technology

Optical methods such as Raman, visible-near infrared (VIS-NIR) and fluorescence spectrometry cannot be employed independently to characterize physical oil properties such as viscosity or total acid number (TAN). However, combining any of these optical techniques with multivariate analysis allows the sensor to describe and predict physical properties. Eltron has developed a proprietary model and library of data that can be used in conjunction with a Raman spectrometer to evaluate engine oil. Though the technology was developed for use in turbine engines, it can be adapted to evaluate hydraulic and other fluids.

Benefits and Applications

The greatest advantage of this technology is the inherent wealth of information contained in Raman and UV spectra. Consequently, Eltron's oil health sensor can provide a much more detailed profile of oil condition than any single sensor. It can be used to determine a wide variety of properties ranging from viscosity and acidity level to the presence of contaminants.

Since this sensor technology essentially is an advanced statistical model that interprets Raman spectral data, its applications are many and varied.

Benefits

- Detailed profile of oil health
- Easily incorporated for a variety of applications
- Simple, numerical output
- Can be used for portable applications

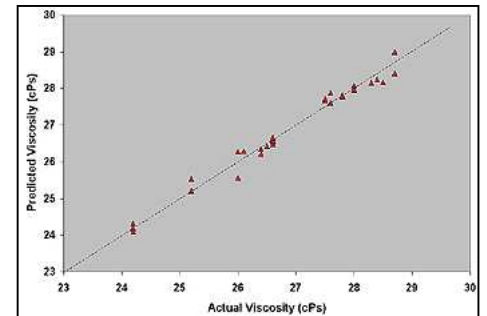
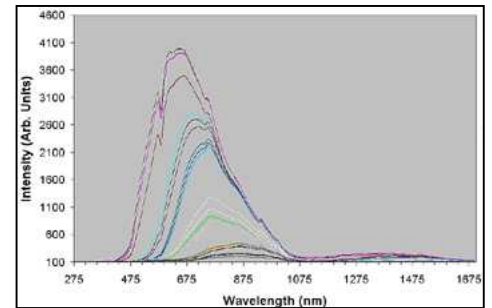


Figure 1. Top: VIS-NIR data collected on turbine oil degraded as a function of time.

Bottom: Linear plot of predicted vs. actual viscosity.

It can be the analysis engine for a portable fluid diagnostic device. It can also be used as an *in situ* oil health monitor for turbine engines. In this application, a rugged, submersible, high-temperature sensor probe is fitted directly into the oil reservoir of a turbine engine. The probe light and spectral signal is passed between the spectrometer and oil reservoir through a fiber optic cable. Sensor hardware then uses the proprietary model to assess the extent of oil degradation. The analysis results can be displayed in a configurable user interface that shows the predicted viscosity and a numerical index rating the oil condition.

Figures 1 and 2 illustrate this embodiment of the technology. Figure 1 shows a set of VIS-NIR data collected on turbine oil degraded as a function of time. A viscosity measurement is also collected for each VIS-NIR spectra. This data is then imported into a proprietary chemometric model. The model can then be used to describe and accurately predict the viscosity of turbine oil. Once created, this model can be permanently integrated into a sensor system.

Stage of Development

This technology comprises an off-the-shelf Raman sensor coupled with Eltron's proprietary statistical model and data library. This is ready to go to market today.

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Contact Us

To discuss the possibility of entering into a business relationship with Eltron, contact the Business Development Group at business@eltronresearch.com.

To learn more about Eltron Research & Development and the many technologies that the company is researching and commercializing, visit www.eltronresearch.com.

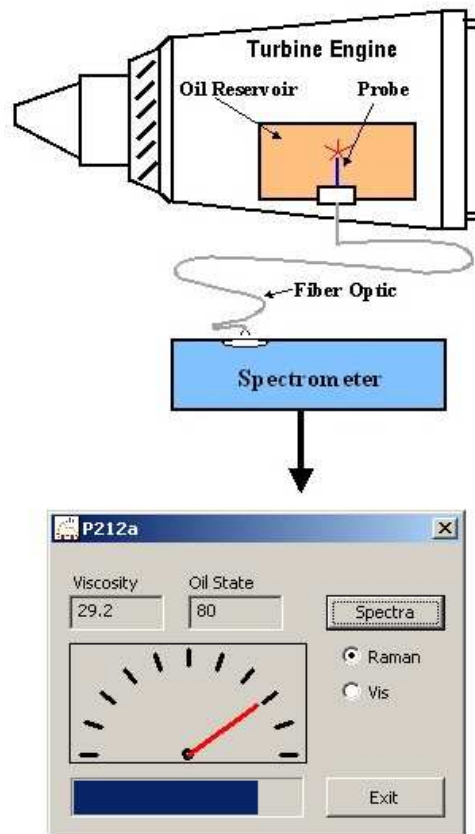


Figure 2. Schematic of possible turbine engine oil viscosity sensor.



Eltron Research & Development Inc.

Eltron Research & Development Inc. commercializes novel technologies involving advanced materials, energy, water and environmental systems.