

Application Focus: Green Chemistry - Environmental Applications for Optical Emission Spectroscopy

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Researchers at Colorado State University are using Optical Emission Spectroscopy (OES) to do quantitative analysis on methyl tert-butyl ether (MTBE) in well water. Of particular concern to chemists and environmentalists are well water contaminants such as MTBE which are associated with fuel oxygenate additives because they partition into the aqueous phase.

Researchers working under Dr. Ellen Fisher at Colorado State University are interested in the application of inductively coupled rf plasmas in the removal of the organic contaminants CH₃OH and MTBE from artificially contaminated water. Their research method involves feeding contaminated water vapor into the plasma and as fragmented species become excited they emit light as they relax back down to the ground state. The wavelengths of the emitted light are characteristic of the molecule or molecular fragments they came from. In some cases, the intensity of the emitted light can be correlated to the concentration of organic species in the original water sample through actinometry (see figures 1 and 2 to the left).

The Fisher research group uses an irradiance calibrated AvaSpec multi-channel spectrometer for their optical emission spectroscopy studies. The 0.05 nm and higher resolution afforded by a multichannel spectrometer make this configuration ideal for optical emission spectroscopy. Irradiance calibration is required to make quantitative measurements.

For more information about Avantes multi-channel spectrometers for optical emission spectroscopy and similar measurements, please contact a sales engineer at 1-866-678-4248 or email us at infoUSA@avantes.com.

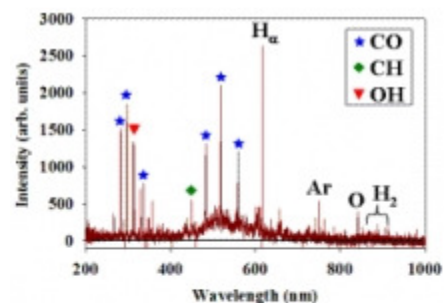


Figure 1: OES Spectrum

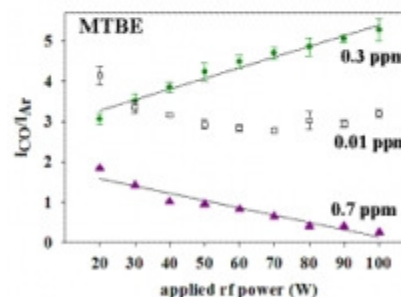


Figure 2: CO peak variation correlated to applied rf power

Researchers in the adjacent application article employed an irradiance calibrated Avantes multi-channel spectrometer system.