



# COMBUSTION MEASUREMENTS AND KINETICS

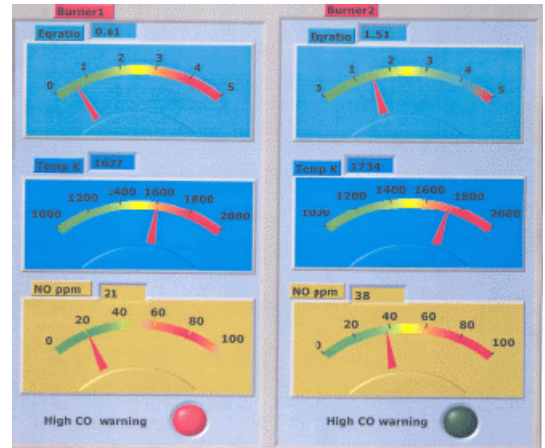
CLEAN ENERGY TECHNOLOGIES

## FLAME EMISSION SPECTROSCOPY AT CANMET

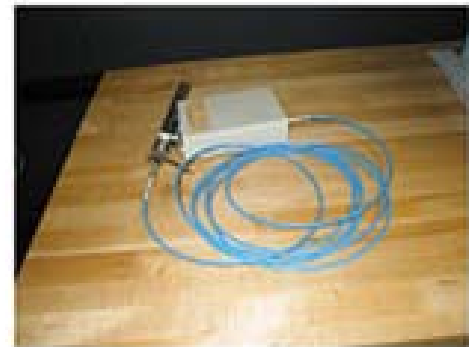
CANMET has applied flame emission spectroscopy to develop a burner monitoring system referred to as FLAMESPEC. This technology is based on acquiring and analyzing flame radiation dispersed over a wide spectral region by using economical commercial spectrometers.

The robust design of these spectrometers, with built in optics and detector electronics, makes them suitable for industrial applications. Flame radiation collected with wide spectral range spectrometers can provide much more useful information about burner performance than single photodiode based flame scanners. FLAMESPEC utilizes the fact that the flame spectral profile is a function of the air and fuel flow rates, air temperature and other input conditions used to fire a burner. Specially designed analysis schemes developed at CANMET, enable the extraction of flame parameters such as air/fuel ratio, high CO warning, NO emission levels, flame on/off conditions and temperature from natural gas flame spectra learned under known operating conditions.

This flame monitoring system from CANMET, consists of a cooled fiber optic probe coupled to a handheld portable commercial spectrometer and a laptop computer and is driven by Labview based software with a user friendly interface. Progress achieved thus far indicates that an intelligent burner advisory system can be designed around FLAMESPEC.



User Interface



Spectrometer with Probe

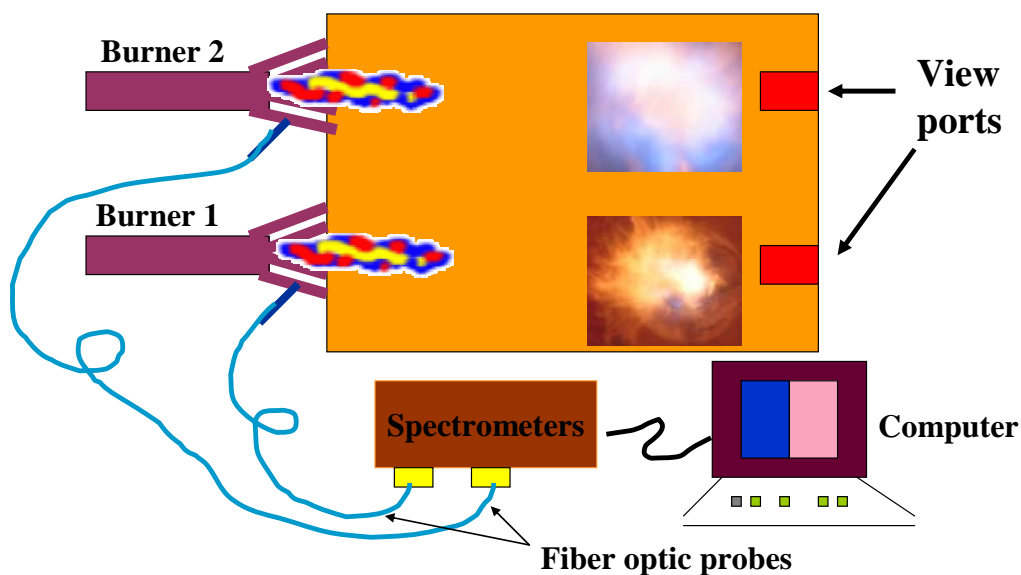
Partial funding from Enbridge Canada allowed us to test this technology with commercial natural gas burners installed in a pilot scale combustion facility as well as in a three burner semi-industrial furnace. These tests demonstrated that flame spectroscopy can be applied to make useful predictions of air/fuel ratio, high CO warning, temperature and NO emissions. Industrial partners are invited to collaborate in the development of a burner control system based on the CANMET approach, to suit their combustion facilities.

### Your Invitation to Work with Us

We are interested in collaborating with you. Please contact the Business Office to discuss your particular needs.

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*The Schematic Setup*

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