CETC

CANMET Energy Technology Centre

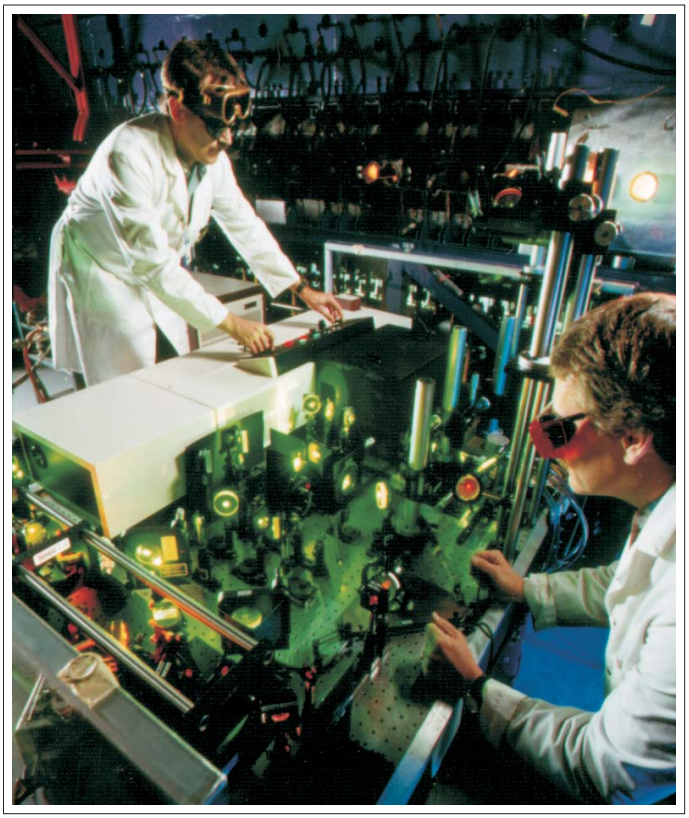
Our Power is Innovation

Non-Intrusive Measurement of Flame Temperature

Advanced Combustion Technologies

Coherent Anti-Stokes Raman Spectroscopy (CARS)

The CANMET Energy Technology Centre (CETC) has developed a non-intrusive measurement technique, known as Coherent Anti-Stokes Raman Spectroscopy (CARS), for monitoring flame temperature and identifying chemical species in flames.



Mobile CARS Unit

Industrial Participation

CETC plans to form a consortium of companies interested in further refining and utilizing the CARS technique for their own operational needs. The work program will be tailored to the needs of member companies, and the research results generated will be shared by all consortium members. A mobile CARS unit will be made available for on-site measurements. Members, if they wish, may individually contract CETC for specific confidential research.

Benefits of CARS

The technique can readily assist manufacturers in designing burner systems for the combustion of a wide range of solid and gaseous fuels by:

- comparatively demonstrating the performance of lower-grade, cheaper fuels;
- selecting the best burner for a given fuel-furnace combination, thus helping to reduce operating costs;

- mapping flame regions of high temperature gradient; and
- defining optimum operating conditions for a given burner/furnace combination.

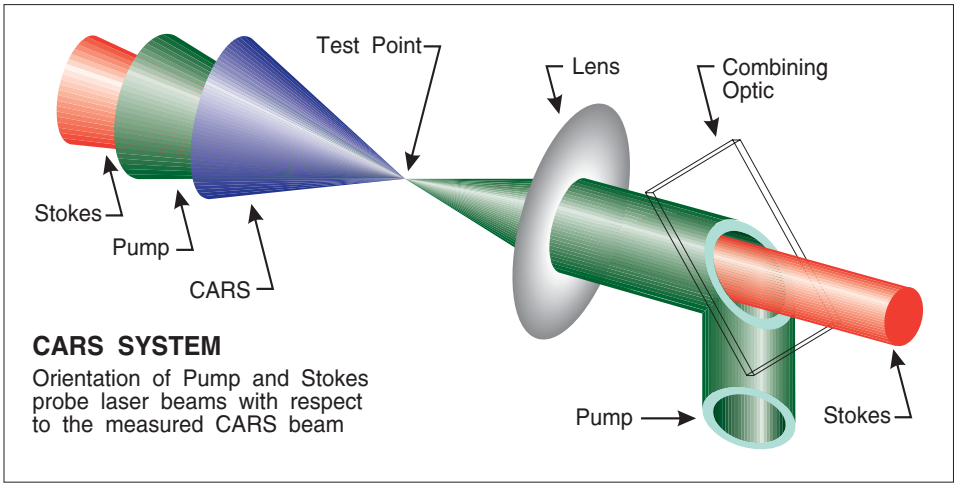
CARS uses laser beams to measure the temperature and species concentration non-intrusively at any point in a flame envelope. CARS shows precisely what is happening inside each element of a flame, even when conditions are changing rapidly over a short span within the flame envelope. This capability is quite unlike the conventional, intrusive sampling probes, which can disturb the chemistry of the flame and distort the results sought.

How CARS Works

Two laser beams from different angles focus at a certain point in a flame. At the point of intersection, the molecules interact with the intense electro-magnetic fields to produce a CARS signal.

This signal emerges as a laser-like beam that identifies the molecules and their temperature at the intersection point. With its high spatial and temporal resolution, CARS can analyze a volume ranging from 1 mL to 0.1 µL in 10^{-8} seconds.

Molecular species are analyzed by spectral plot. Probability distribution functions of temperature and concentration can be plotted at any desired point from the data collected.



CARS System

Your Invitation to Work with Us

We are interested in collaborating with you. Fully funded and cost-shared contracts as well as special bilateral agreements can be put in place to assist industry in the application of this technology.

For further information, please contact:

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