Technology Opportunity

Rare Earth Optical Temperature Sensor

The National Aeronautics and Space Administration (NASA) seeks to transfer an optical temperature sensor technology to industrial users. This sensor is suitable for high temperatures (400–2000 °C) and hostile environments.

Potential Commercial Uses

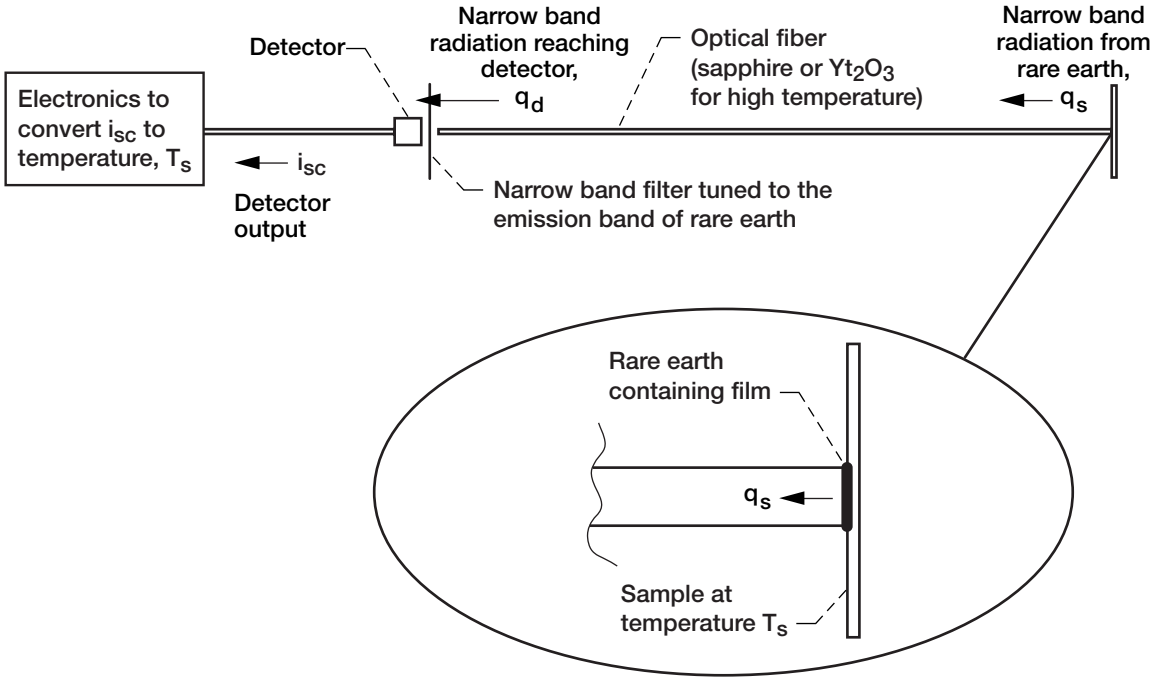
- Aerospace temperature measurements
  - Rocket nozzles
  - Turbojet combustors and turbines
  - Reentry vehicle surfaces
- Chemical and Metallurgical temperature measurements
  - Combustion processes such as automobile engines
  - Refining of metals such as steel making

Benefits

- Sensor operates in reactive and corrosive environments
- Sensor operation does not require knowledge of emittance of sample being measured
- Excellent response time (~1 msec)
- Excellent high temperature resolution (~1 °C)
- Low cost

The Technology

The temperature sensor is a spin-off of research on rare-earth doped selective emitters for thermophotovoltaic (TPV) energy conversion. The key component of the sensor is the rare earth containing material at the end of the sensor that is in contact



Schematic of rare earth optical temperature sensor.

with the sample being measured. Narrow wavelength band emission from the rare earth is transmitted to an optical detector by an optical fiber. An electronics package converts the detector output to a temperature reading. The new sensor is expected to cost about one-fifth of the cost of current instruments.

Options for Commercialization

Seeking partnerships with potential users in industry or academia to further develop the system. Also seeking industrial partners to cooperatively develop additional applications for this technology.

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Key Words

Optical
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High temperature operation