

Bachelor Thesis

Construction of a microscope-based workplace for butt-welding of thermocouples and testing in flames

Background:

Thermocouples (TC) are an indispensable and widely used instrument for temperature measurement in technical systems, e.g. for temperature monitoring and for scientific interest. For spatially and temporally resolved temperature measurements in reactive media (e.g. flames), these devices reach the limits of thermal resilience and reliability. The production of very thin TCs with wire diameters of less than 200 μm (see figure) is challenging.

At the institute, a stereo-microscope will be used as a tool for the fabrication of TCs by welding two thermocouple wires (see example figure). The such produced TCs will be tested for temperature measurements in standard flames.



Tasks:

- Get familiar with the topics "Thermovoltage, thermocouple, temperature measurement, optical pyrometry"
- Setting up a work bench at the microscope with holders/translators for installing and positioning the thermocouple wires and the welding device
- Micro butt-welding of thermowires (using welding torch or a spark discharger)
- Assembly of the manufactured TCs for connection to readout units and measuring flame temperatures in a small model burner



Requirements:

Study of Engineering, Physics or Chemistry; Interest in experimental work, knowledge in combustion theory, measurement technology and optics is of advantage

Start: immediately

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