

Pyrometric Temperature Measurements in the Solar Furnace

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Abstract

Surface temperatures are key parameters in many applications of concentrated solar radiation. Pyrometric temperature determination is here hampered by the present reflected solar radiation. The thermally emitted radiation can be separated from the reflected solar radiation if the reflectance of the hot surface element and the spectral distribution of the incoming radiation are known. Based on this idea, the FAMP (Flash Assisted Multiwavelength Pyrometry) method¹⁾ was developed at PSI for temperature measurements in solar furnaces. With this method temperature, emittance, and irradiance of an irradiated Lambertian surface element are determined simultaneously. Based on a quite different approach is a so called "solar-blind" pyrometer which is sensitive only in one of the small spectral regions where solar radiation is almost completely absorbed by the atmosphere. Such a solar-blind pyrometer was built by the IMPAC Electronic GmbH in Frankfurt, Germany, in collaboration with PSI. The paper will report results of temperature measurements where simultaneously both pyrometers were applied on solar reactors. Advantages and disadvantages of the two different pyrometers will be discussed too.

¹⁾ H. R. Tschudi and M. Schubnell, Measuring temperatures in the presence of external radiation by flash assisted multiwavelength pyrometry, *Rev. Sci. Instr.* **70**, 2719 - 2727, 1999