Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

An application of the emissive layer technique to temperature measurements by infrared optical pyrometer CAMILLE CHAUVIN, JACQUES PETIT, FRÉDÉRIC SINATTI, CEA Gramat, CEA GRAMAT TEAM — A reliable measurement of the temperature of a material under dynamic loading is fundamental to differentiate its EOS. This aim is difficult to reach for temperatures lower than 1000 K due to the low amplitude of the radiated energy. A pyrometer has been developed at CEA Gramat to detect temperature from 373 K with a response time of 70 ns. An important parameter governing the material temperature estimation from the radiance measurements between the material and a LiF window is the evaluation of the dynamic emissivity. A way to overcome the lack of knowledge of emissivity consists in artificially increasing the emissivity of the material up to an apparent value of approximately 0.8 by the use of an emissive layer. The detected radiance is amplified and the range of dynamic emissivity is restricted. Promising results at material and LiF interface with an emissive layer of ReSi2 indicate that the mechanical, thermal and optical properties of this layer can be estimated and the sample temperature can be deduced. This paper investigates different parameters (roughness) potentially influencing the measured radiances at this complex interface.

Camille Chauvin
CEA Gramat

Date submitted: 18 Feb 2011 Electronic form version 1.4