PERIODIC METHOD FOR CHARACTERIZATION OF GLASS BY USE OF AN ANALYTICAL MODEL

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ABSTRACT. This paper presents an analytical method based on the quadrupole formulation (transfer matrix) that allows one dimensional calculation of the coupled heat transfer that occurs by both radiation and conduction transport phenomena in glasses or ceramics at high temperatures. This model is used to investigate a well known experimental technique (periodic method) that is classically used for opaque materials in order to determine their thermal diffusivity thanks to the measurement of the phase lag evolution versus frequency. The underlying idea is to see whether such an experiment applied to semi-transparent materials (STM) is able - as it is the case for the flash method – to evaluate the phononic or lattice thermal conductivity and possibly an average extinction coefficient. Some preliminary responses are given here through a stochastic analysis on the wanted parameters.