# Curing Evolution Inspection of Buried Epoxy Resin using Photothermal Radiometry

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In a wide variety of applications, epoxy resins are used frequently in such a way that they remain buried inside of some materials. Therefore it is important to have methods to determine how the curing process evolves under such conditions. In this work the curing of a buried epoxy resin inside of a graphite matrix is investigated using infrared photothermal radiometry. The monitoring is performed measuring the evolution of thermal properties of the epoxy resin as a function of time. In a first approximation the thermal properties are evaluated using a one dimensional model. In order to evaluate the usefulness of the one dimensional approximation, a three dimensional approach is used to obtain the thermal properties. In this approach, the theoretical and experimental analysis of the finite laser beam and the finite size of the sensor are investigated and the effects on the thermal wave reflections are considered. Using a Gaussian spot laser heating, it can be shown that the three dimensional effects are dominant in the phase of the photothermal signal when the difference between the thermal properties of the graphite and the resin increases. In this case, the absolute value of the reflection coefficient between the sample and substrate is close to one.