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**Image Analysis Method for Measuring the Cladding Thickness of
Nuclear Fuel Plates**

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ABSTRACT

Fuel plates used in research reactors have a meat containing the fissile nuclear material which is hermetically encapsulated by aluminum claddings. The thickness of the cladding is an important specification of the fuel. Different techniques have been used to determine the cladding thickness, which can be destructive or non-destructive. Non-destructive techniques require expensive equipment. For this reason, many manufacturers adopt metallography as the method for measuring the thickness of claddings and also of the fuel meat, which is a simple and inexpensive method. Because it is a destructive method, a number of the fabricated fuel plates is subjected to this type of analysis. Generally, polished sections of some samples taken from the fuel plate are inspected by optical microscopy. This work proposes a methodology for measuring the claddings and fuel meat thicknesses that adopts the automatic processing and analysis of images obtained from samples prepared by metallography. Sample preparation is simplified and images obtained by scanning electron microscopy are used. The time required to get the results is considerably smaller than that required by the traditional metallographic method and the statistical basis of the measurements is substantially enlarged.