SCANNING THERMAL MICROSCOPY: FROM NANOMETERS TO MILLIMETERS

KLAPETEK Petr, VALTR Miroslav, ŠPERKA Jiří, HORTVÍK Václav, MARTINEK Jan

Czech Metrology Institute, Brno, Czech Republic, EU

Abstract

In the contribution we present an overview of development of a large area Scanning Thermal Microscope combined with infrared radiometry sensor. Large area Scanning Probe Microscopy (SPM) is a technique bridging the gap between high resolution surface properties mapping 3D state-of-the-art techniques available at limited spatial range in various commercial SPM systems and conventional methods acting on much larger spatial scales like profilometry or confocal microscopy. Development of 3D tools capable of acquiring high resolution data on large areas is very important not only for metrological support in semiconductor or optical industry, but it is also crucial for traceability of the SPM techniques itself. Presented combined large area Scanning Thermal Microscopy (SThM) and Infrared Radiometry system was developed for analysis of local temperature and local thermal conductivity variations with very high spatial resolution. Main purpose of this device is to form a traceability route from conventional thermal conductivity and temperature measurement methods (which have poor spatial resolution, but excellent temperature/conductivity resolution) towards Scanning Thermal Microscopy, which has high spatial 3D resolution, but is still understood more like qualitative rather than quantitative technique. Measurement examples using unique device prototype are shown on both passive and active experimental setups.

Keywords: Scanning Thermal Microscopy, large area SPM

Author did not supply full text of the paper.