

DEFECTIVITY CONTROL SYSTEM FOR SEMICONDUCTOR WAFERS AND STRUCTURES*

A.E. VINNIK, A.V. TYAZEV, O.P. TOLBANOV, L.K. SHAIMERDENOVA, M.S. SKAKUNOV

Tomsk State University, Tomsk, Russia

At the moment the actual method of semiconductor wafer defect control is the method of structure detection by means of DSL etching. It should be noted that wafers are different parts of a single-crystal ingot. Consequently, at different depths of the ingot, the wafer defectivity varies, which entails multiple etching processes. One of the main disadvantages of the DSL etching method is that this method is a destructive inspection method.

An alternative to the DSL etch method is the use of IR radiation. This approach provides information not only about defects located on the surface, but also about defects located in the entire volume of the wafer. The wafer is not subjected to any destructive effects and can be used for further production.

The system is designed for automatic non-contact non-destructive control of volume and surface defects in semiconductor wafers and structures up to 150 mm in diameter, as well as for topology control of integrated circuit elements on semiconductor substrates.

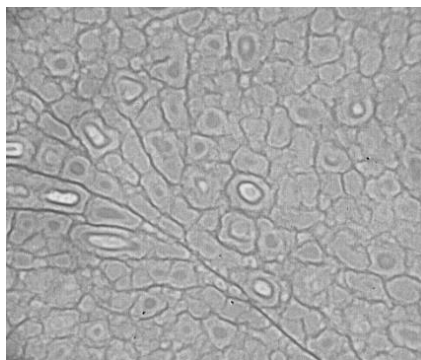


Fig.1. Image of a fragment of HR GaAs:Cr wafer in transmitted infrared radiation.

The operating principle of the system is based on measuring the spatial distribution of the intensity of short-wave infrared radiation (SWIR) passing through the controlled object. A camera based on multielement InGaAs sensors is used as a receiver of IR radiation. The source of radiation is an optical system based on a IR source. Mapping of the substrate area is performed by moving it along XY coordinates in the space between the radiation source and receiver by means of stepper motors.

The system operation is controlled by the original software supporting the functions of scanning algorithm selection, "stitching" of images of separate areas into a whole, image analysis and data storage.

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