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X-RAY MICROBEAM MEASUREMENT OF TRI-AXIAL STRAIN IN AL INTERCONNECTS IN FABRICATED MICROCHIPS*

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X-RAY MICROBEAM MEASUREMENT OF TRI-AXIAL STRAIN IN AL INTERCONNECTS IN FABRICATED MICROCHIPS*

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Collaborative development of submicron x-ray beam diffraction capabilities on the MHATT-CAT beam line of the Advanced Photon Source and collaborative development of white/monochromatic analysis software at ORNL and LBNL have made possible direct measurement of grain orientation and tri-axial deviatoric strain in metal interconnects. We have combined white and monochromatic microbeam x-ray diffraction techniques to investigate inter- and intra-granular orientation and tri-axial strain in passivated Al interconnects in fabricated microchip devices. Critical aspects of the measurement and analysis techniques will be discussed, and results of strain measurements in interconnects of varying sizes and shelf-time after manufacture will be presented.

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