INTEGRATION OF SCANNING PROBES WITH ION BEAMS WITH APPLICATION TO SINGLE ION IMPLANTATION

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Abstract

The integration of scanning probes with ion beams enables non-destructive, nanometer scale imaging and alignment of ion beams to regions of interest in to be implanted device structures. We describe our basic approach which uses piezo-resistive force sensors and pierced cantilvers as dynamic shadow masks, integtrated with low current (<1 mA), low energy (<1 MeV) ion beams from a series of ion sources (ECR and EBIT). Single ion sensing strategies based on charge transients induced in devices and detection of secondary electrons are discussed. We will show results form our studies of single ion doping of 50 nm scale transistors in tests of radiation response mapping of transistors with this technique.

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