Abstract of Presentation

Presentation Title:

Illumination-collection mode scanning near-field optical microscopy and Raman spectroscopy with aperture-less pyramidal cantilever probe

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Abstract :

We have studied the possibility to detect optical images, Kerr effect images for magnetic domain detection and Raman spectrum for stress distribution in Si device with high resolution of <10 nm. In the near-field optical and the Kerr effect images, we have achieved their high resolution images using depolarization optical detection for near-field light detection with circular polarization light, a through the lens (TTL) type optical lever detection for atomic force microscopy (AFM) and aperture-less pyramidal cantilever probe for high spatial resolution. Furthermore, in near-field Raman spectroscopy, we have achieved to detect Raman peak shift with high resolution of < 50 nm using the aperture-less pyramidal cantilever probe. As experimental results, we demonstrated the fine optical images of small gold grains pattern on Si substrate with <10 nm, Kerr effect images of recorded magnetic domains on magneto-optical (MO) disc with < 20 nm, and silicon Raman spectrum of the fine gate-like pattern for stress distribution detection of small device with a spatial resolution of <50 nm.