

## Dithering Sample Stage Based Near-field Scanning Optical Microscope

박경덕, 정문석

광주과학기술원 고등광기술연구소

We developed a new scheme for the highly sensitive near-field scanning optical microscope (NSOM) by using a dithering sample stage rather than a dithering probe. In the proposed scheme, the sample is directly loaded on one prong surface of a dithering bare tuning fork. Gap control between probe and sample is performed by detecting the shear force between an immobile fiber probe and the dithering sample. In a conventional NSOM, the Q factor drastically decreases from 7783 to 1000 or even to 100 by attaching a probe to the tuning fork. In our proposed NSOM, on the contrary, the Q factor does not change significantly, 7783 to 7480, when the sample is loaded directly to the tuning fork instead of attaching a probe. Consequently, the graphene sheets that cannot be observed by a conventional NSOM were clearly observed by the proposed method with sub-nanometer vertical resolution due to the extremely high Q factor.

**Keywords:** NSOM, Q factor, Graphene

