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(54) **DEVICE AND METHOD FOR AN ATOMIC FORCE MICROSCOPE FOR THE STUDY AND MODIFICATION OF SURFACE PROPERTIES**

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(57) **ABSTRACT**

The invention relates to a device for an atomic force microscope (AFM) for the study and/or modification of surface properties. The device comprises a cantilever (flexible bar) having an integrated, piezoresistive sensor, an integrated bimorphic actuator, and a measuring tip. The measuring tip carries at least two metal electrodes, which can be activated via electrical terminals. The measuring tip and/or the cantilever have at least one nanoscopic hole through which synchrotron radiation or laser light is directed onto the material surface to be studied. Furthermore, the invention relates to a method for the study and modification of surface properties and surface-proximal properties, which can be executed using such a device. To this end, atomic force microscopy (AFM), surface enhanced Raman scattering (SERS), photo emission spectroscopy (XPS, XAS), and material modification by local exposure are executed in sequence or simultaneously using the same device.