

Rapid Functional Recognition Imaging in Scanning Probe Microscopy

Disclosure Number

200802190

Technology Summary

A data acquisition, processing, and control method in scanning probe microscopy achieves rapid recognition imaging of local properties and functionality in inorganic, molecular, polymer, and biological systems. The method, further referred as functional recognition imaging, is based on rapid acquisition and automatic de-noising, classification, and interpretation of spectral, multimodal, or multispectral data sets (multidimensional data) at each spatial pixel. This recognition step substitutes e.g. classical homodyne based data processing method in conventional SPM or simple post-processing of multidimensional data. This approach allows to (a) generate recognition images at standard imaging speed, (b) obviate the need for storage of large multidimensional data sets, (c) avoid lengthy post-processing and (d) extract material parameters obviating the need for exact analytical models. This approach can be applied to all force-, current- and optics- based scanning probe microscopy techniques including, but not limited to, intermittent contact atomic force microscopy, non-contact atomic force microscopy, atomic force acoustic microscopy, and piezoresponse force microscopy.

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