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P8. Effect of Environment on Measurements of Glass Surface Potential by Kelvin Probe Force Microscopy

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One of the modern methods to explore surface potential and corresponding charge distribution of solids at nanoscale is Kelvin probe force microscopy (KPFM) [1]. Unfortunately, repeatability of Kelvin probe measurement in ambient air often is poor, especially for low-conductivity specimens. This may be explained by number of factors: charging of the material itself, degradation of the conductive Kelvin probe, contamination of the surface etc. The present study explores effect of environmental factors on the results of glass surface potential measurements.

The research was carried out by analysis of the average value of glass surface potential (U), measured over the area of 5x5μm of the glass specimen, kept under certain conditions.

To model effect of ambient light, microscope was covered with protective hood and specimen was exposed to the visible light flux with luminance ranged from 0 to 1923 lx.

Air temperature effect was evaluated by heating air in polyethylene box placed onto the microscope from 17° to 30°C. Air humidity was raised up to 71% by placing several vessels of water under polythene box and lowered up to 24% by purging of the box by dry nitrogen.

Glass electric surface potential measurements under variable temperature have shown that the potential tends to decrease with rise of temperature at the rate of 0,02 V/C ±35%.

The increase of air humidity makes narrower spread of repeated specimen surface potential measurements: the range of the measured values was 0.6 V at relative humidity 25% and only 0.15 V at relative humidity 70%. This may be explained by adsorption of water layer that shield intrinsic surface potential of the glass.

No significant correlation between surface potential and ambient light luminance was found.

Keywords: *electric surface potential, Kelvin probe force microscopy, glass surface.*

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