

High-resolution imaging of the nanostructured surface of polyacrylonitrile-based fibers

Polyacrylonitrile-based carbon fibers utilizing two different AFM probes, a standard tip as used in literature up to now and a recently made available super sharp tip

Sample preparation

There is no mention of special sample preparation to perform AFM.

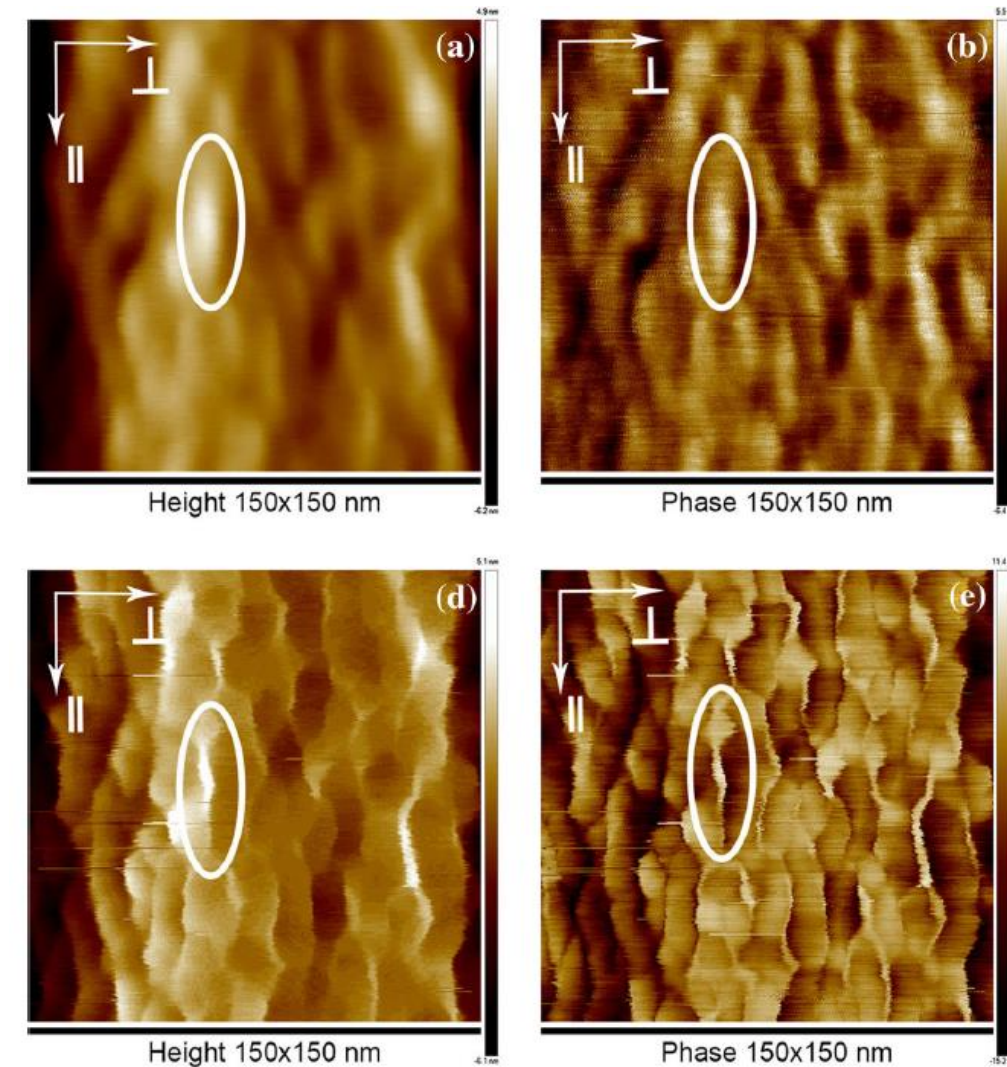
Data acquisition conditions

The AFM measurements of the fibers were performed using a Bruker Dimension ICON in tapping mode both with standard TESPA probes from Bruker (tip radius 8 nm) and super sharp EBD-SSS NCHR AFM probes from Nanotools (tip radius 2-3 nm)

Results

The images obtained with the super sharp tip revealed a nanoporous structure that has not been reported before, these pores are elongated in a direction parallel to the fibre axis as it is shown in the figure, where the II symbol in the upper left corner indicates the fibre axis.

The pore width and length have a monomodal distribution with the mean length being approximately twice than the mean width, it is speculated that the shape of the pores is a consequence of the fibre stretching during processing, analysis of the precursor fibre confirms the existence of round pores.



High-magnification AFM images of a carbon fiber surface scanned with TESPA probe (a, b) and with EBD-SSS probe (d, e)