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In situ electrolytic reduction of copper ions in the mesoporous matrices based on poly(ethylene terephthalate)

Olga V. Arzhakova, Anastasia V. Bolshakova, Aleksandr Yu. Kopnov, Denis K. Chaplygin, Aleksandra A. Zvonova, Sofiya A. Sorochinskaya, Larisa M. Yarysheva and Alena Yu. Yarysheva

Preparation of the test samples

The samples with a gage size of 50×30mm were cut from the batch roll and stretched at room temperature to a given tensile strain ε. The samples were stretched in the presence of the PALE with a constant rate of 5 mm/min to tensile strains εvarying from 10 to 400%. Tensile strain ε was defined as:

$$\varepsilon = \frac{\Delta l}{l_0} \times 100\% \quad (1),$$

where Δl is the difference between the final and initial length of the sample, l_0 is the initial length of the sample.

Porosity

In the course of tensile drawing of the PET films, changes in their geometric dimensions (length, thickness, and width) and volume were measured. The accuracy of measurements did not exceed 3-5%. Porosity W(or volume strain) reads as:

$$W = \frac{\Delta V}{V_0 + \Delta V} 100\% \quad (3)$$

where V_0 is the initial volume of the sample, ΔV is the difference between the volume of the deformed sample and the initial sample V_0. The experimental error was 3%.

WAXS studies

The test samples were studied on a DRON-3M diffractometer (Russia) (Cu; 20 mA 30 kV; wavelength was 1.541874 Å).

Scanning Electron Microscopy (SEM)

Structure of the samples was studied using an EVO 40 XPV scanning electron microscope (Zeiss, Germany). Prior to the SEM observations, the samples were fractured along the stretching direction in liquid nitrogen and decorated with a conducting platinum layer with a thickness of 50–70 nm using a Giko IB-3 setup.