

Nanostructured surfaces

Nanoscale structurization in welded joint of different types of PE

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Nowadays three types of PE, namely PE-63, PE-80 and PE-100, are used for pipe line engineering. A welding failsafe technology of pipes produced with different types of PE and its development with the goal to reach welds' strength equal to the strength of the basic material are actual problems.

In present work pipes made with PE of different types were butt welded with heated instrument in various combinations. The thermophysical characteristics of welded joints compared to pipes' basic materials (pure PEs) were studied using methods of Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC) and Thermomechanical Analysis (TMA). It is found that the melting temperature of PE-100 is higher comparing to PE-63 and PE-80 that leads to asymmetry of welded joints. Such problem may be solved with using of specific double-area heated instrument. The exploitation characteristics of welded joints compared to pipes' basic materials were studied at elongation, break and impact load. The nanoscale structurization and structural organization in welded joints compared to pipes' basic materials were studied by Wide-Angle X-ray Spectroscopy (WAXS).