Highly porous functional materials such as membranes, bone-like composites with multimodal pore distribution or porous magnetic ceramics are of great interest due to their properties. In this work we studying a number of porous structures with typical pores size from tens nanometers to several micrometers by means of focused ion beam (FIB) nano-tomography. In this particular case SEM images of SPS-sintered Fe2O3 ceramic were obtained using an Helios NanoLab 450S (FEI, The Netherlands) with accelerating voltage of 1 to 5 kV and beam current 100 pA. To obtain information about the internal structure of the samples we carried out studies using the FIB technique. The focused Ga-ion beam allows to get precision cuts with step up to few nanometers [1]. To create three-dimensional reconstructions the FIB tomography technique was used. Series of slices were obtained automatically via FEI Auto Slice and View G3 software. The number of slices was about 200 - 300, with approximately slice thickness of 10-50 nm. Further, the resulting series were processed with FEI Avizo 9.1 software, which allows image processing, reconstruction and analysis of 3-d data. As a result, we can reconstruct three-dimensional internal structure of pores network. This helps to characterize the pores organization, their size distribution, anisotropy and connectivity.


Keywords: Focused ion beam, scanning electron microscopy, 3-D reconstruction