

## PDF ANALYSIS OF GLASSY AND NANOCRYSTALLINE METALLIC MATERIALS.

We have used PDF analysis to investigate structure of metallic glasses and metallic nanoparticles. We studied changes in the structure of metallic glasses during elastic deformation and mechanical creep. The X-ray diffraction was carried in-situ during tensile loading and after high temperature creep. Because upon axial deformation glass becomes anisotropic we used anisotropic analysis. The structure function and PDF was expanded into spherical harmonics; respective components are related by a spherical Bessel functions transformation. We have obtained anisotropic components of  $S(Q)$  and PDF. Analysis of the anisotropic PDF showed that deformation is not entirely elastic but about 25% of the total strain was anelastic. This implies that deformation in metallic glasses is never elastic even for small external stresses.

We studied structure and sintering of gold nanoparticles ( $\sim 5\text{nm}$ ) supported on silica. These particles exhibit strong catalytic activity for the CO oxidation. We observed structural distortions from the f.c.c. structure for the as prepared samples. The distortion was more visible at elevated temperature  $\sim 400\text{ }^\circ\text{C}$ . At temperatures above  $450\text{ }^\circ\text{C}$  particles exhibit rapid growth, which is observed up to  $650\text{ }^\circ\text{C}$ . The final particle size after cooling to the room temperature is about  $150\text{ nm}$ . We will discuss possible mode of the structural distortion and catalytic activity of the gold nanoparticles.