Supporting Information

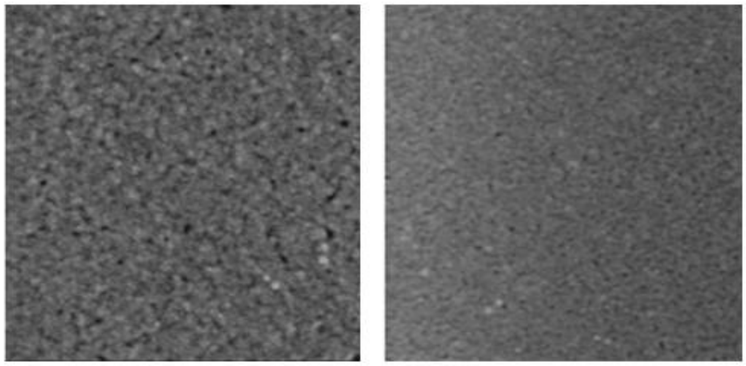

Figure . AFM pictures of PEM before glass-melt transition (left hand side) and PEM_{temp} after glass-melt transition (right hand side); both samples measured in room temperature.

Calculation of the coverage of the surface by particles

n - amount of particles adsorbed at the interface; $n = \frac{M}{m} = \frac{2.25 * 10^{-7} g}{1.38 * 10^{-18} g} = 1.63 * 10^{11} / cm^2$

Where:

M - mass of the adsorbed layer; $M = 2.25 * 10^{-7} g$

m - mass of the single particle; $m = v * \rho = \frac{4}{3} \pi r^3 * \rho = 1.38 * 10^{-18} g$

where:

$v = \frac{4}{3} \pi r^3$ - volume of the single particle; $v = 2.68 * 10^{-19} cm^3$

$r = 4nm$ - radius of a particle

ρ - density on magnetite; $\rho = 5.15 \frac{g}{cm^3}$

$n_{\max}$ - maximal amount of particles adsorbed on the surface; $n_{\max} = \frac{\theta_{\max}}{A} = 1.47 * 10^{12} / cm^2$

Where:

$\theta_{\max} = 74\%$ - maximal coverage of the surface by the ring-shape objects (based only on geometry; all interactions are neglected); $\theta_{\max} = 0.74 cm^2$ per $1 cm^2$

A - surface occupied by a single particle; $A = \pi r^2 = 5.024 x 10^{-13} cm^2$

θ - coverage of the surface by particles; $\theta = \frac{n}{n_{\max}} * 100\% = 11.1\%$