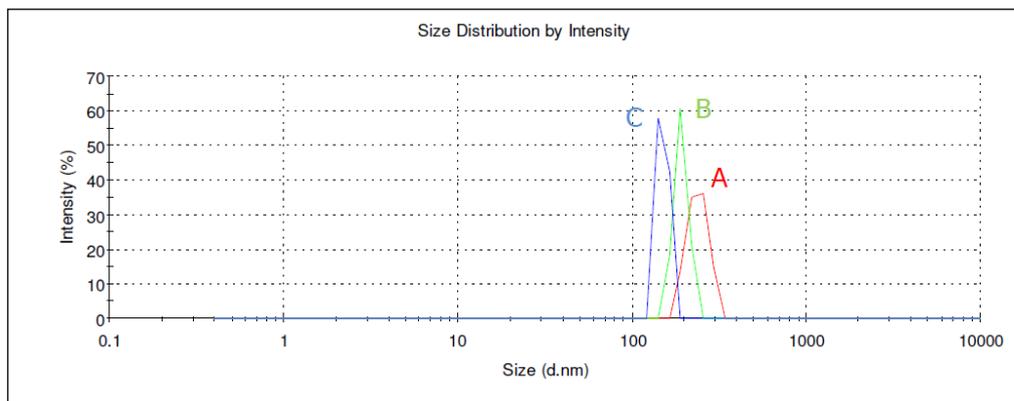


## Supporting information

A)



B)

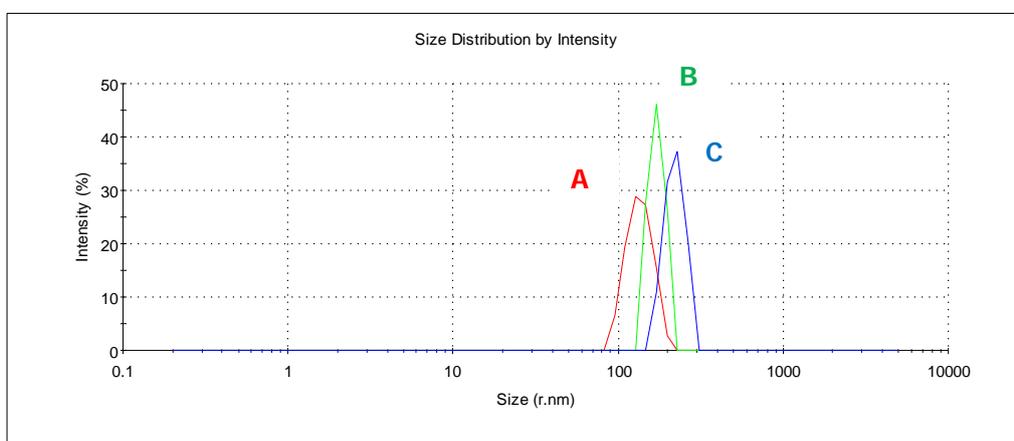
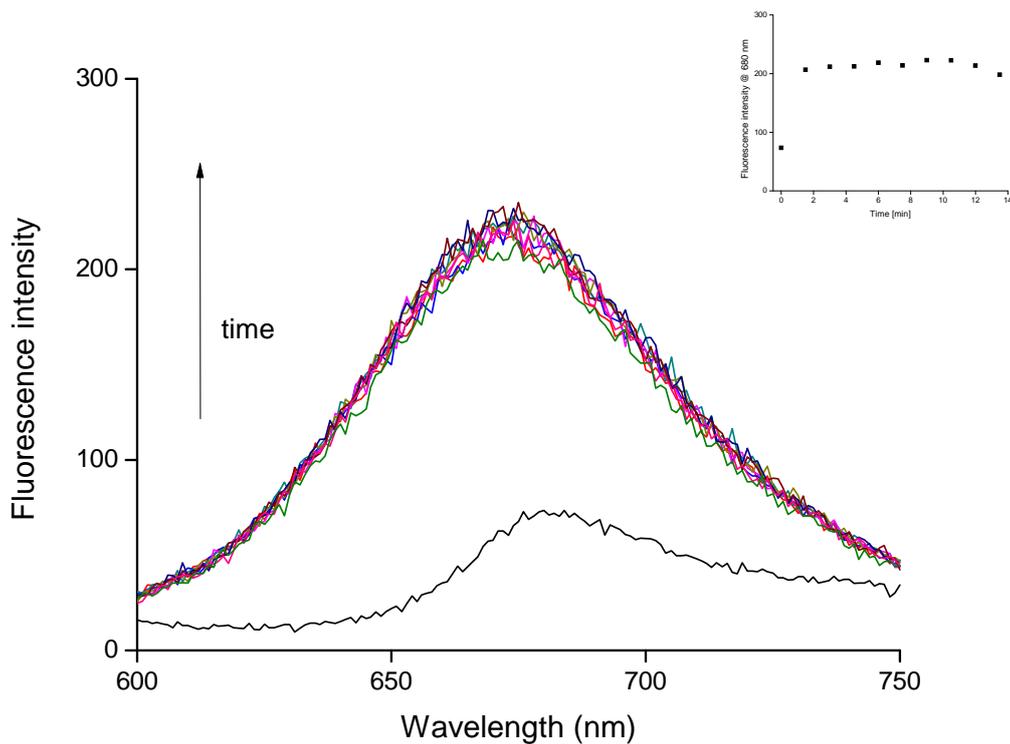


Fig S1. Results of dynamic light scattering measurements of size of obtained spheres. Samples A and B were characterized in  $10^{-3}$  M Tris buffer pH 7.3, whereas sample C in the sample buffer spiked with KCl to reach  $10^{-1}$  M KCl in sample, A) spheres prepared according to procedure A, B) spheres prepared according to procedure B.

A – red line as prepared spheres, B – green line - potassium sensitive spheres following introduction of ionophores and ion-exchanger, C – blue line -potassium sensitive spheres following contact with 0.1 M KCl

A



B

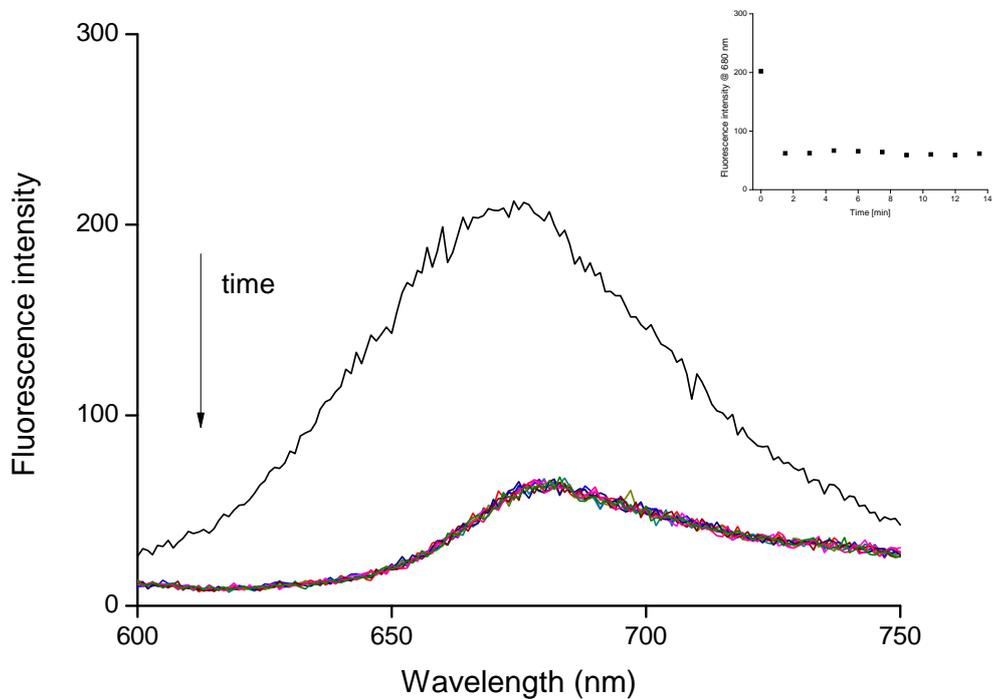


Fig S2. Change of the fluorescence spectra of pH-sensitive nanospheres following pH change: a) from 2.1 to 12.1 and b) from 12.1 to 2.1. Spectra were recorded every 1.5 minutes, in both cases first spectra ( $t = 0$ ) were recorded for initial pH value.

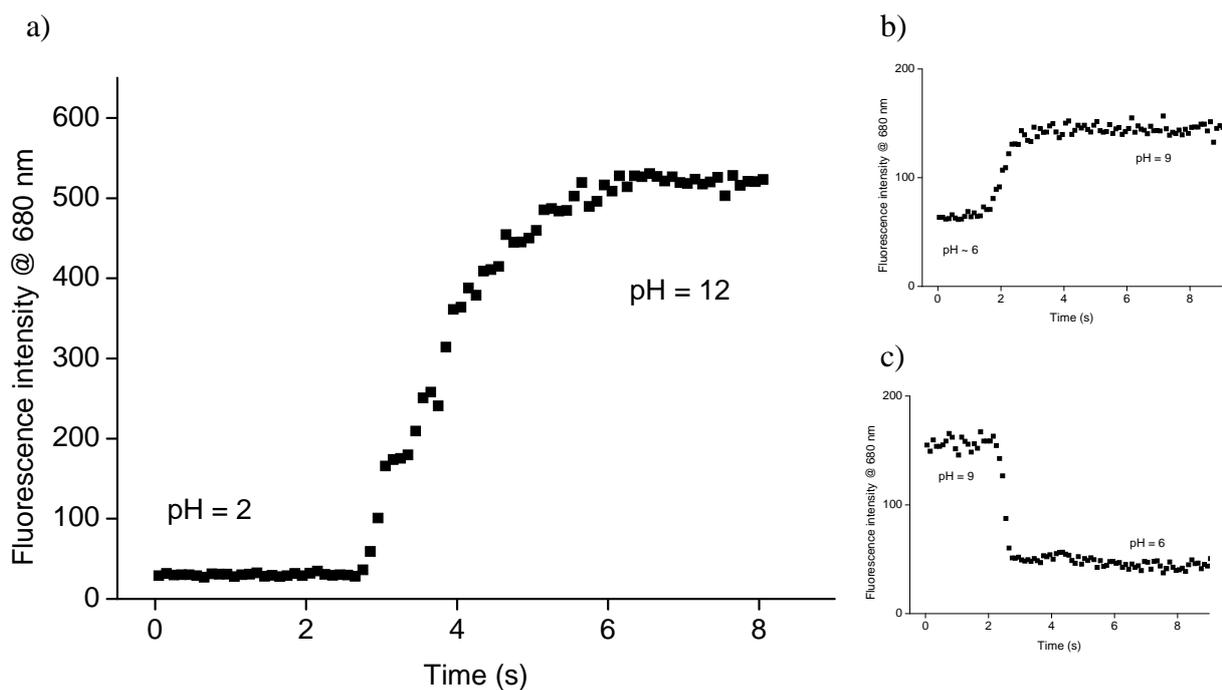


Fig S3. Change of the fluorescence intensity recorded at 680 nm for pH-sensitive nanospheres following pH change a) from 2 to 12 (addition of NaOH to HCl solution), insets show the change in the fluorescence intensity accompanying smaller pH change from b) unbuffered deionized water (pH close to 6) to pH 9 and c) from pH 9 (diluted NaOH) to pH 6 (pH changes achieved by addition of NaOH or HCl, respectively).

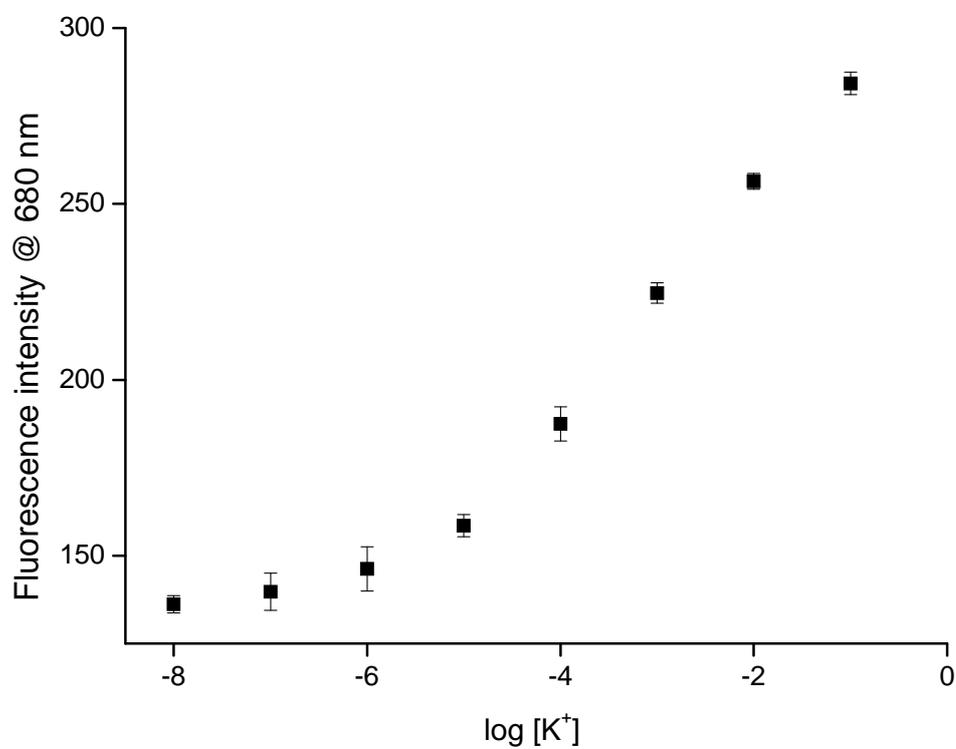


Fig S4. Dependence of fluorescence intensity on logarithm of K<sup>+</sup> ions concentration, the mean signal recorded at 680 nm together with standard deviation from nanospheres prepared in three different synthetic runs recorded for K<sup>+</sup>-sensitive nanospheres (prepared according to procedure B).