Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting information

Magneto-Plasmonic Nanostructures for SERS: Magnetite Decorated by Silver and Gold Nanoparticles

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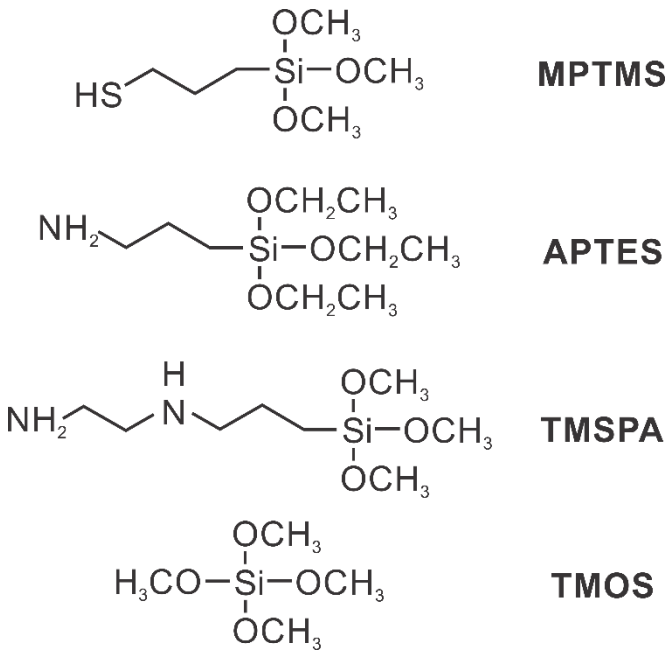

Figure S 1 Structural formula of silanes used in Fe_3O_4 modification

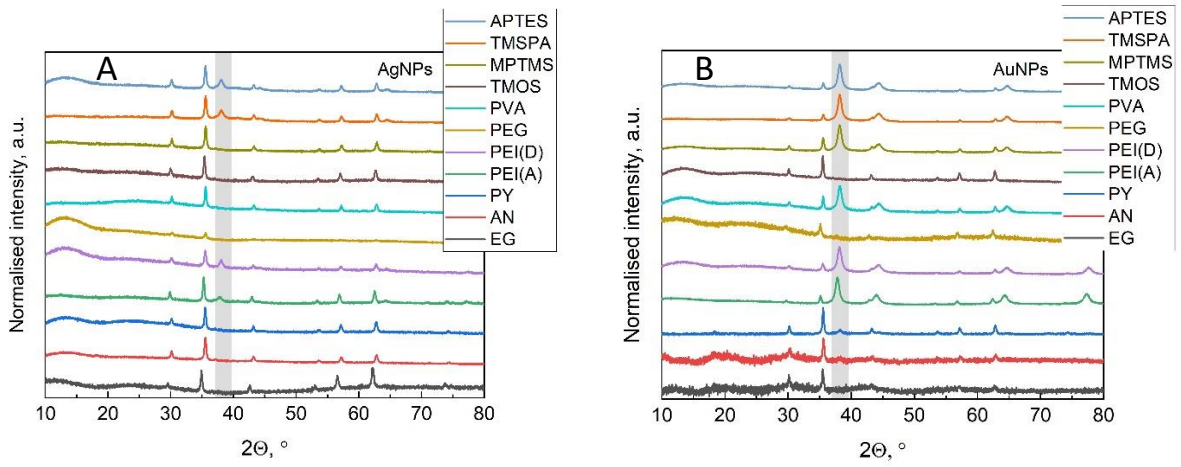

Figure S 2 X-ray spectra of magnetite nanoparticles modified using monomers, polymers and silanes, decorated with A) silver and B) gold nanoparticles. Gray column indicates the characteristic peak of AgNPs or AuNPs.

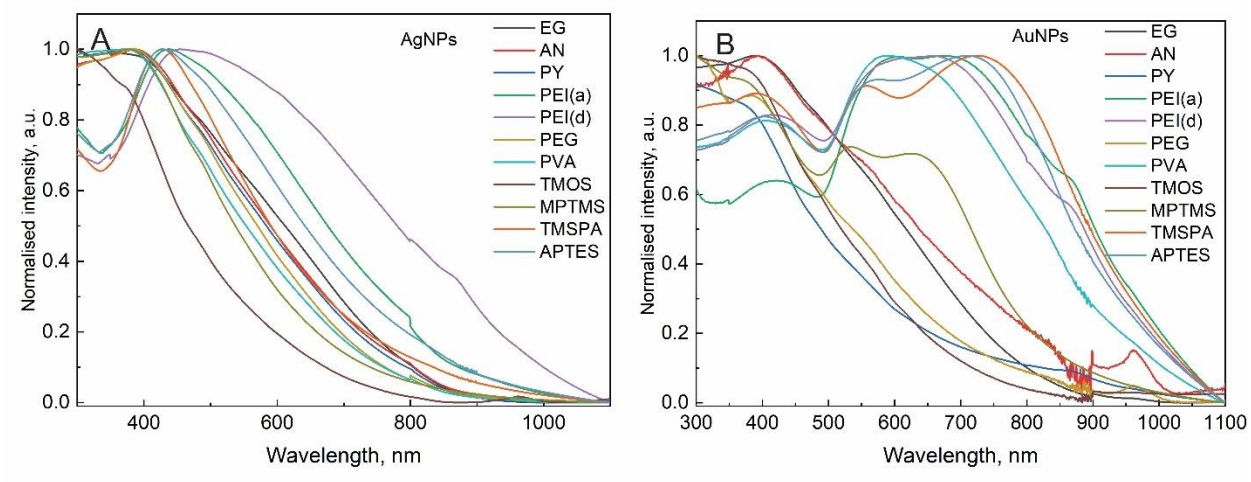

Figure S 3 UV-Vis absorption spectra of magnetite nanoparticles modified using monomers, polymers and silanes, decorated with A) silver and B) gold nanoparticles. All spectra normalized from 0 to 1 in order to see the difference in plasmonic band. For AgNPs plasmonic peak is at 440 nm, while for gold mostly two peaks are visible at 560 nm and 720 nm.

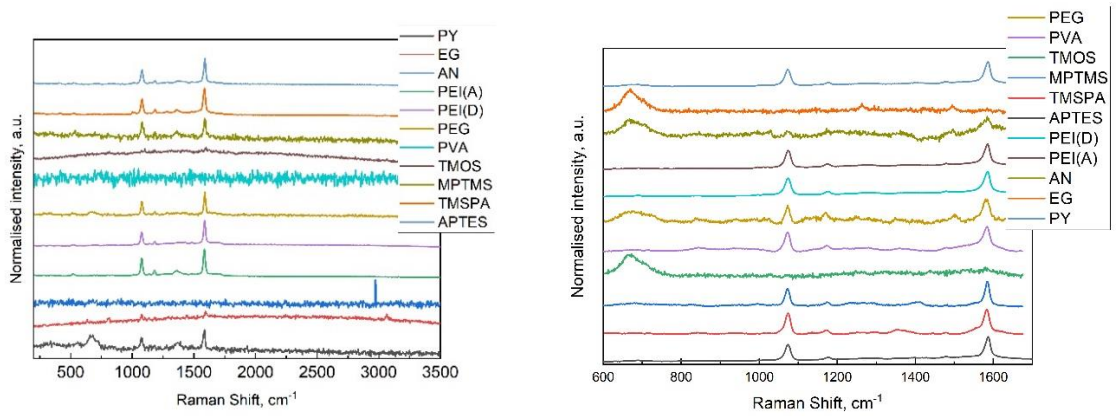

Figure S 4 SERS spectra of magnetic nanoparticles modified with different molecules: monomers, polymers and silanes and decorated with AgNPs and AuNPs separately. As the probe molecule 4-MBA molecule was chosen, for AgNPs decorated samples 532 nm laser light was used while for AuNPs decorated sample 632 nm laser line was used. All the samples were normalized to 1 in order to better see the 4-MBA peaks.

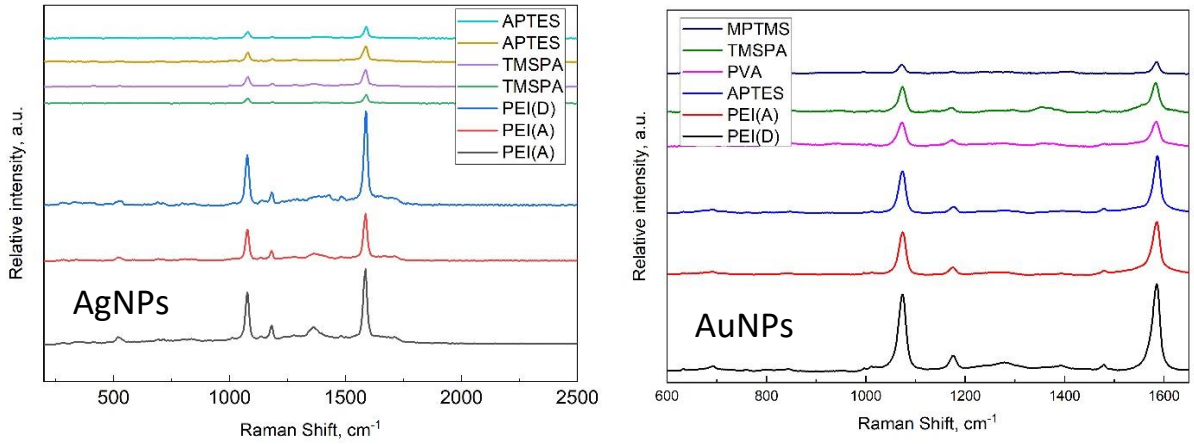

Figure S 5 Not normalized SERS spectra of magnetic nanoparticles modified with different molecules: monomers, polymers and silanes and decorated with AgNPs and AuNPs separately. As the probe molecule 4-MBA molecule was chosen, for AgNPs decorated samples 532 nm laser light was used while for AuNPs decorated sample 632 nm laser line was used.

Table S 1 Different decoration procedure of the magnetite nanoparticles covered with PEI. The abbreviation of each sample and mixed volumes in the first and the second decoration steps are presented.

Abbreviation	First decoration step	Second decoration step
Fe_3O_4@PEI_A@Ag_{50}@Au_{100}	2.5 ml AgNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	5 ml AuNPs + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Ag_{50}@Au_{75}	2.5 ml AgNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	3.75 ml AuNPs + 1.25 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Ag_{50}@Au_{50}	2.5 ml AgNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	2.5 ml AuNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Ag_{50}@Au_{25}	2.5 ml AgNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	1.25 ml AuNPs + 3.75 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Au_{50}@Ag_{100}	2.5 ml AuNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	5 ml AgNPs + 0.4 ml Fe_3O_4

Fe_3O_4@PEI_A@Au_{50}@Ag_{75}	2.5 ml AuNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	3.75 ml AgNPs + 1.25 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Au_{50}@Ag_{50}	2.5 ml AuNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	2.5 ml AgNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Au_{50}@Ag_{25}	2.5 ml AuNPs + 2.5 ml H_2O + 0.4 ml Fe_3O_4	1.25 ml AgNPs + 3.75 ml H_2O + 0.4 ml Fe_3O_4
Fe_3O_4@PEI_A@Au_{50}/Ag_{50}	2.5 ml AuNPs + 2.5 ml AgNPs + 0.4 ml Fe_3O_4	

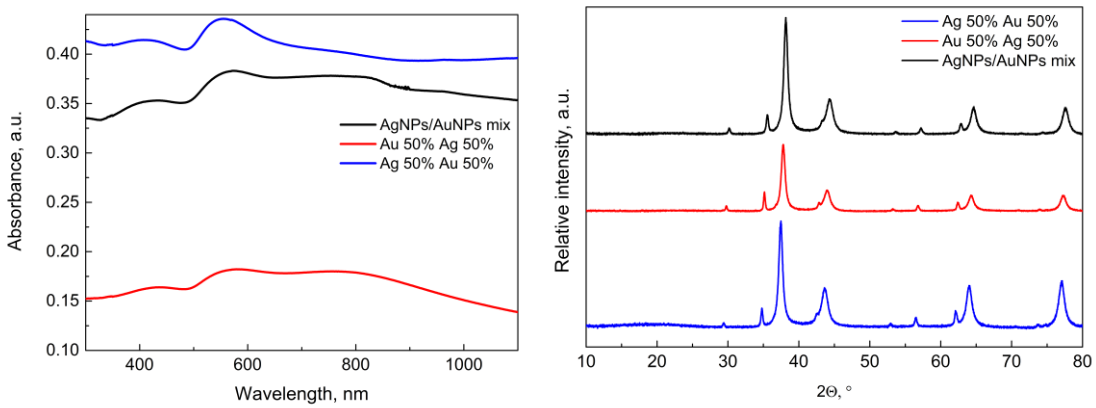

Figure S 6 UV-Vis and XRD spectra comparison of plasmonic decoration of magnetite with the same amount, but different order AuNPs and AgNPs.