Supporting Information

Superior plasmon absorption in iron-doped gold nanoparticles

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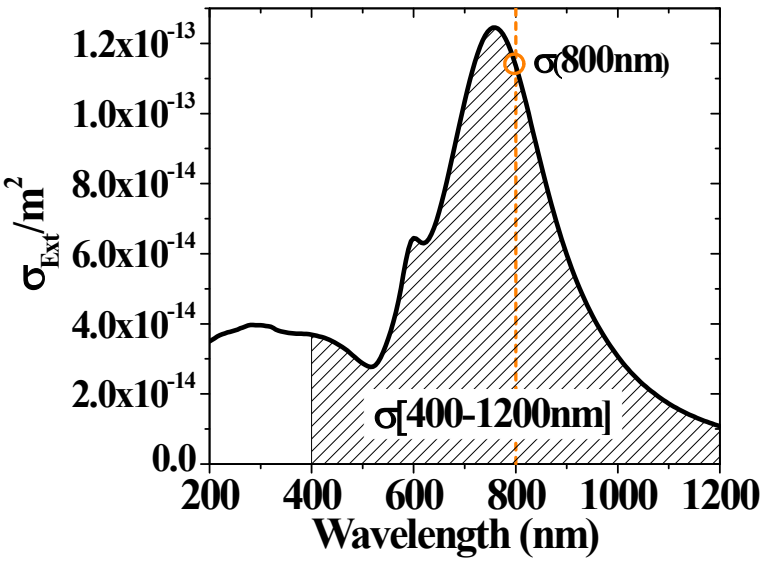

Figure S1. Explanation of the two parametrers σ[400-1200nm] and σ(800nm): the first is the area of the cross section in the 400-1200nm spectral range (in m^3), the latter is its value at 800nm (in m^2).

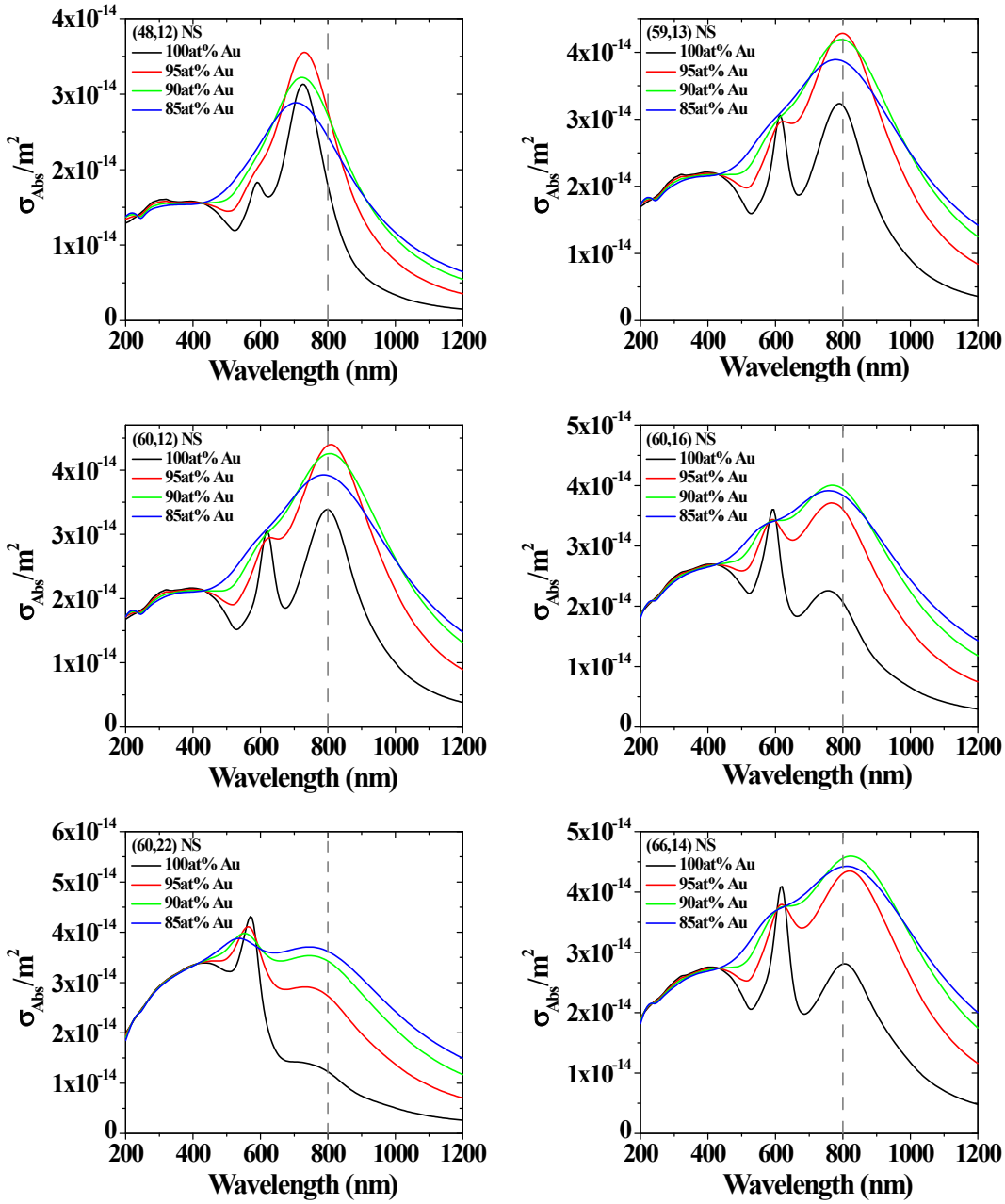

Figure S2. Mie theory calculations of σ_{Abs} in iron-doped NSs with structural parameters extracted from literature (for details see the manuscript). Matrix is water in all cases.

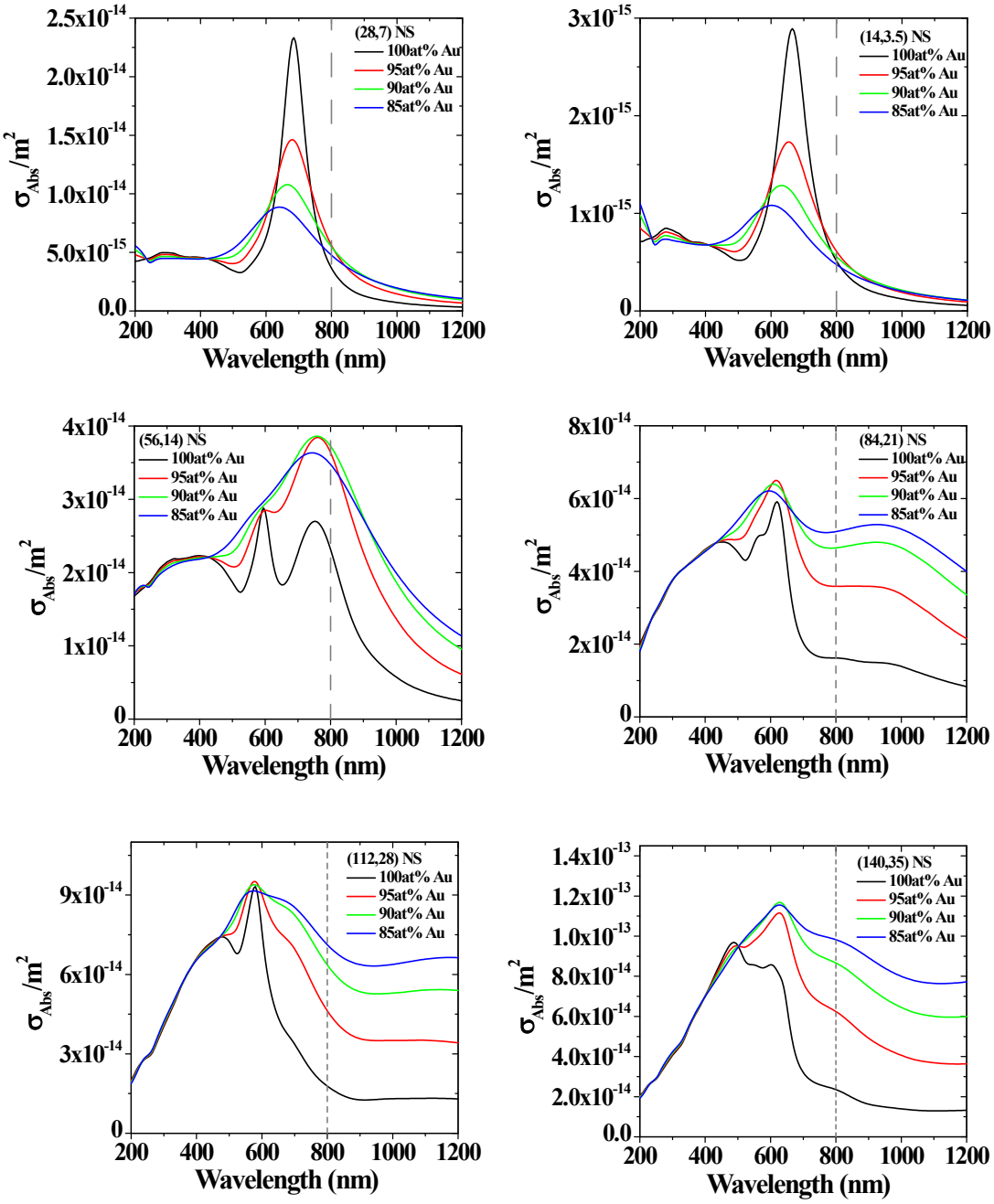

Figure S3. Mie theory calculations of σ_{Abs} in iron-doped NSs with constant ratio of core radius and shell thickness (4:1) and variable size.

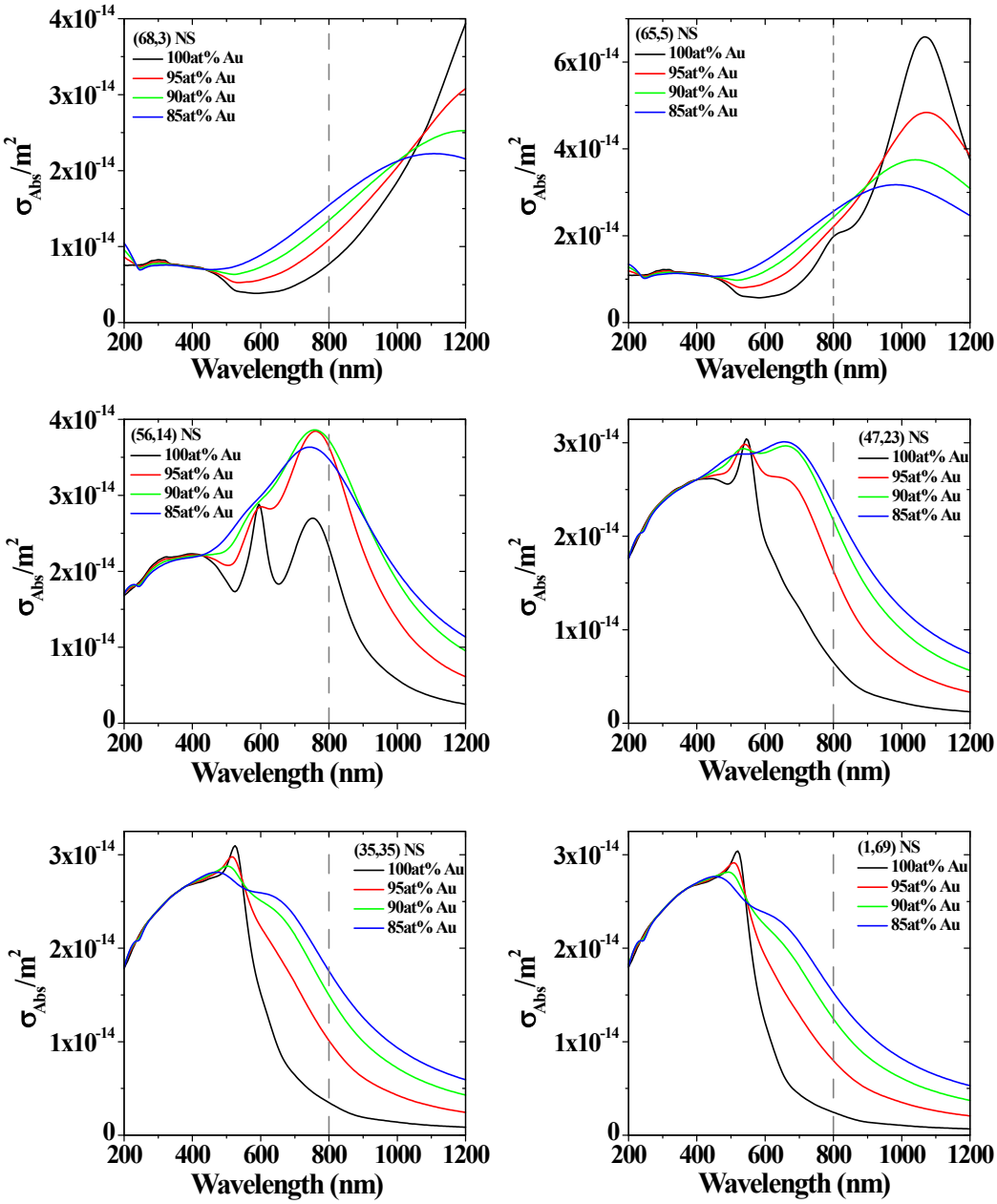

Figure S4. Mie theory calculations of σ_{Abs} in iron-doped NSs with constant diameter (140nm) and variable ratio of core radius and shell thickness.

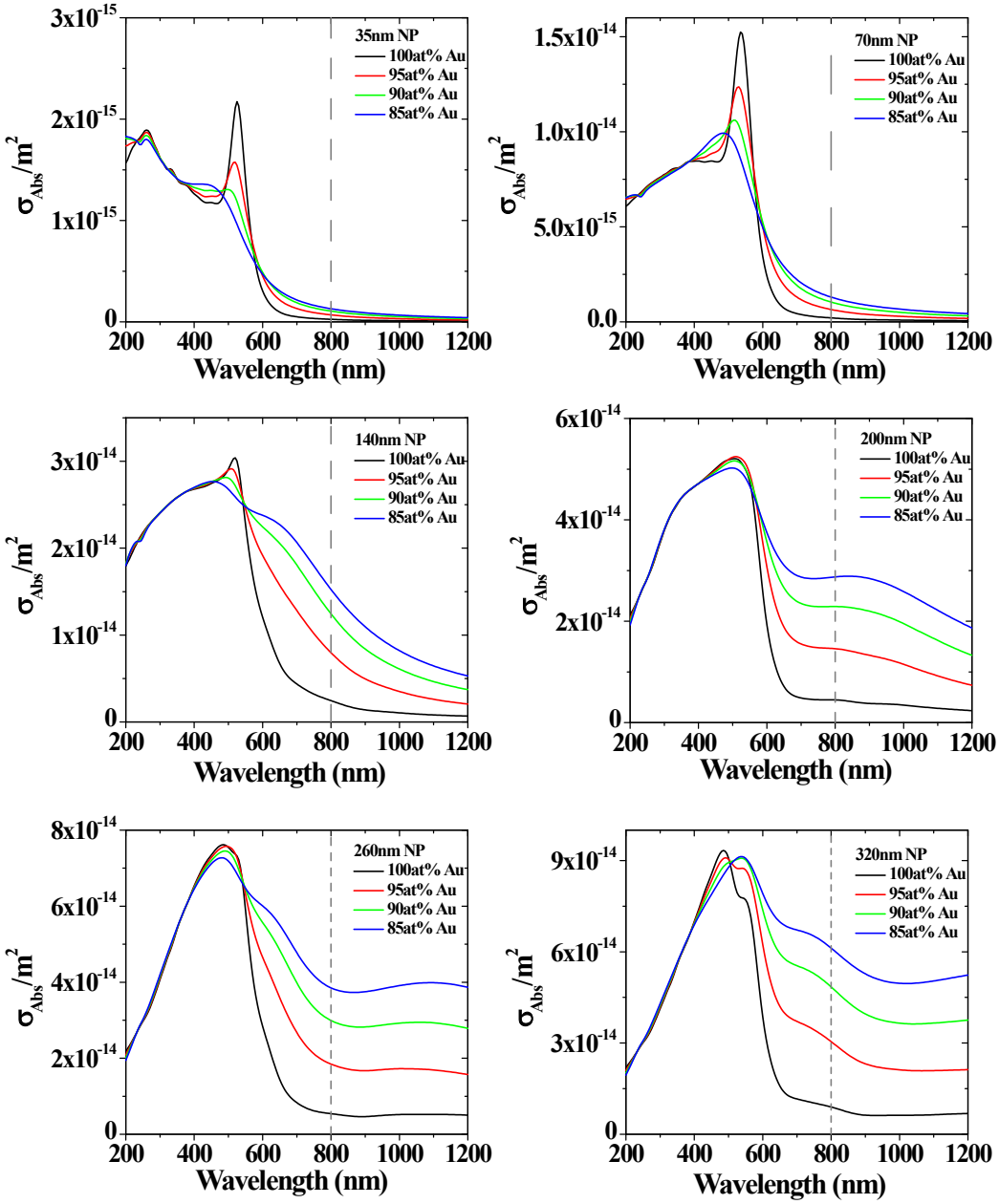

Figure S5. Mie theory calculations of σ_{Abs} in iron-doped nanospheres with variable size.

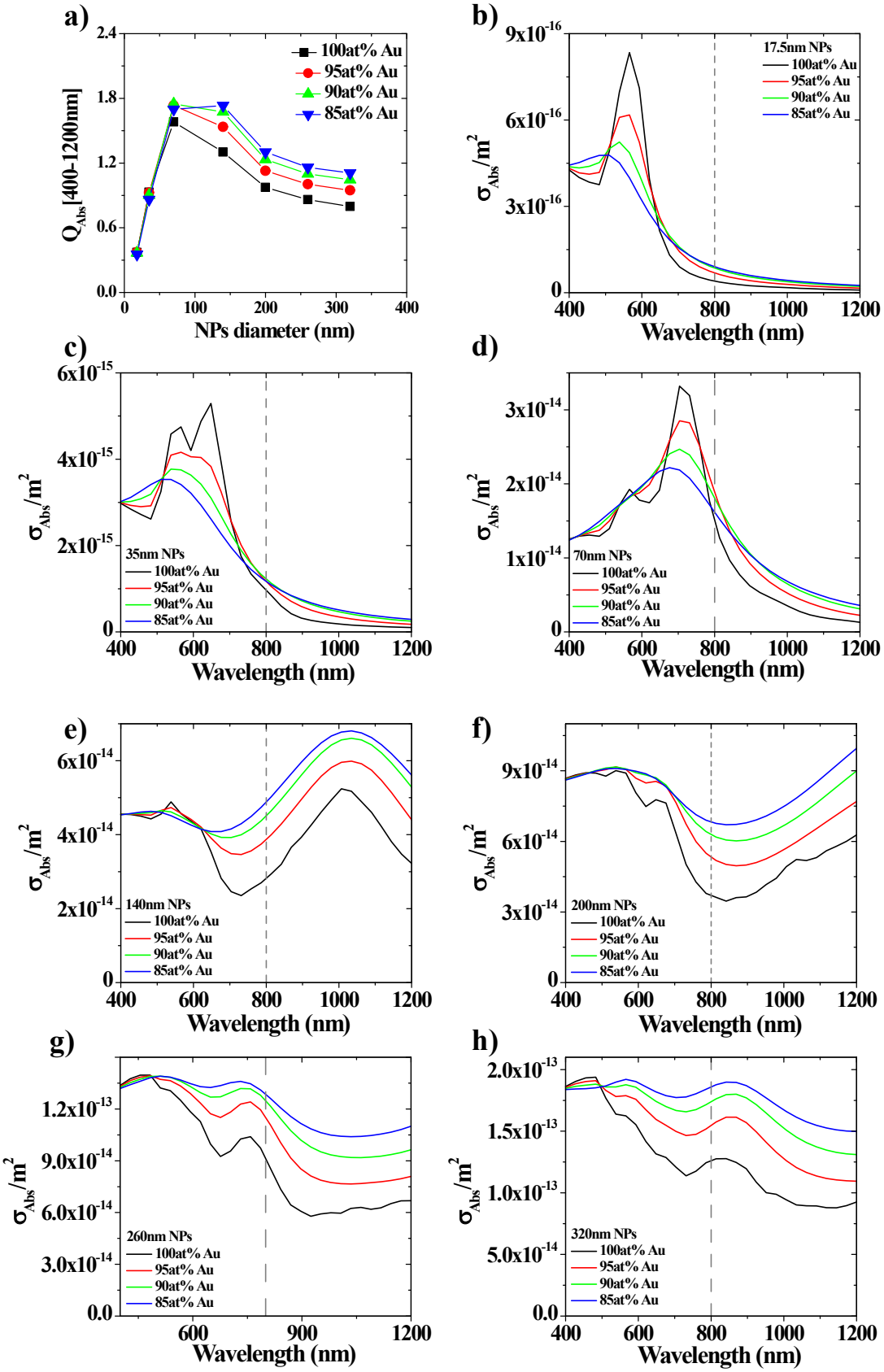

Figure S6. DDA calculations of σ_{Abs} in iron-doped dimers of two identical nanospheres with variable size and interparticle gap of 1nm. (a) Integral in the 400-1200nm range of $C_{Abs}= \sigma_{Abs}/(\pi R^2)$, where R is the sphere's radius. In this graph, the difference in absorption among the four different compositions are more evident. (b-h) Spectral dependence of σ_{Abs}.

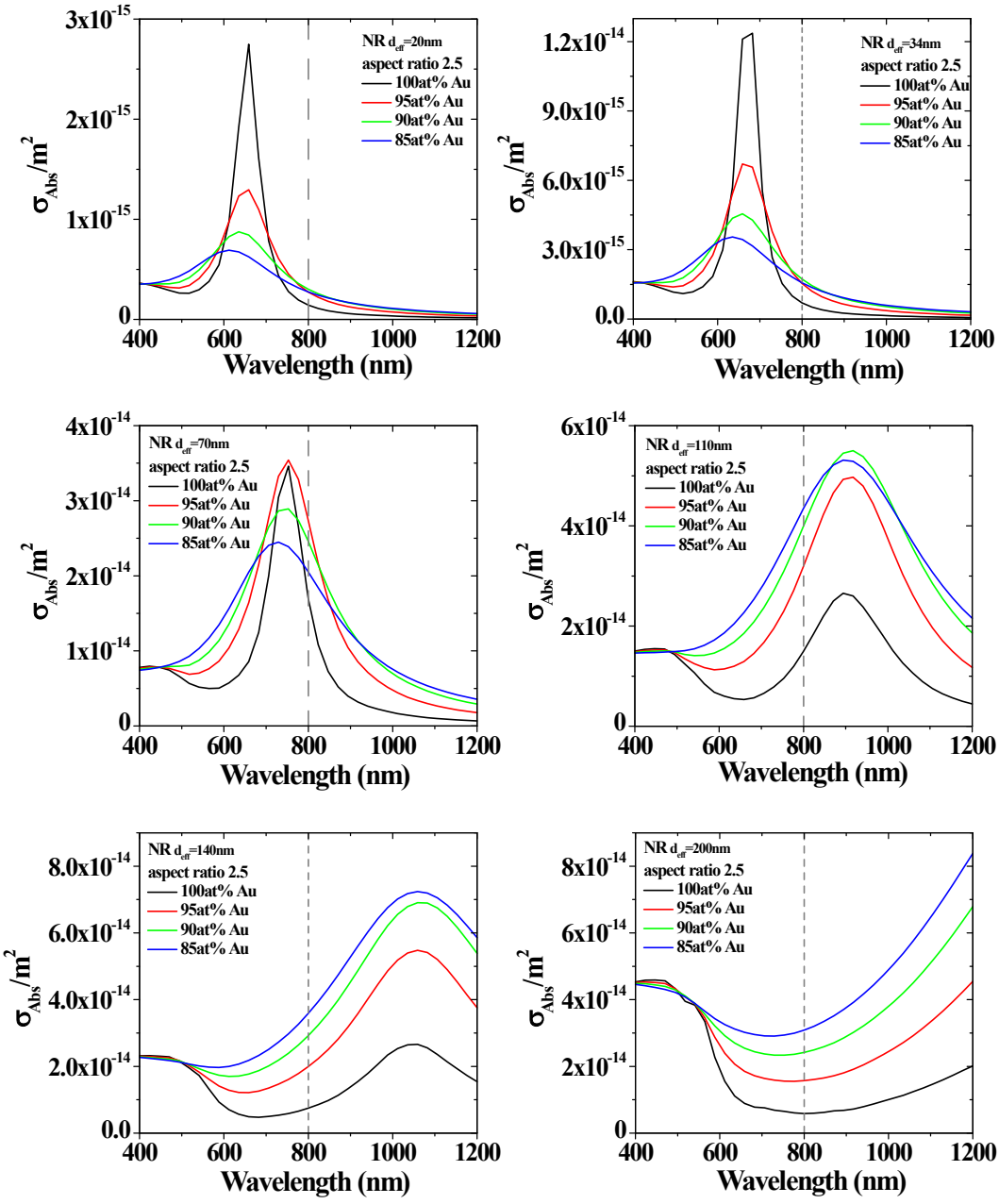

Figure S7. DDA calculations of σ_{Abs} in iron-doped hemispherical NRs with variable size and constant aspect ratio of 2.5.

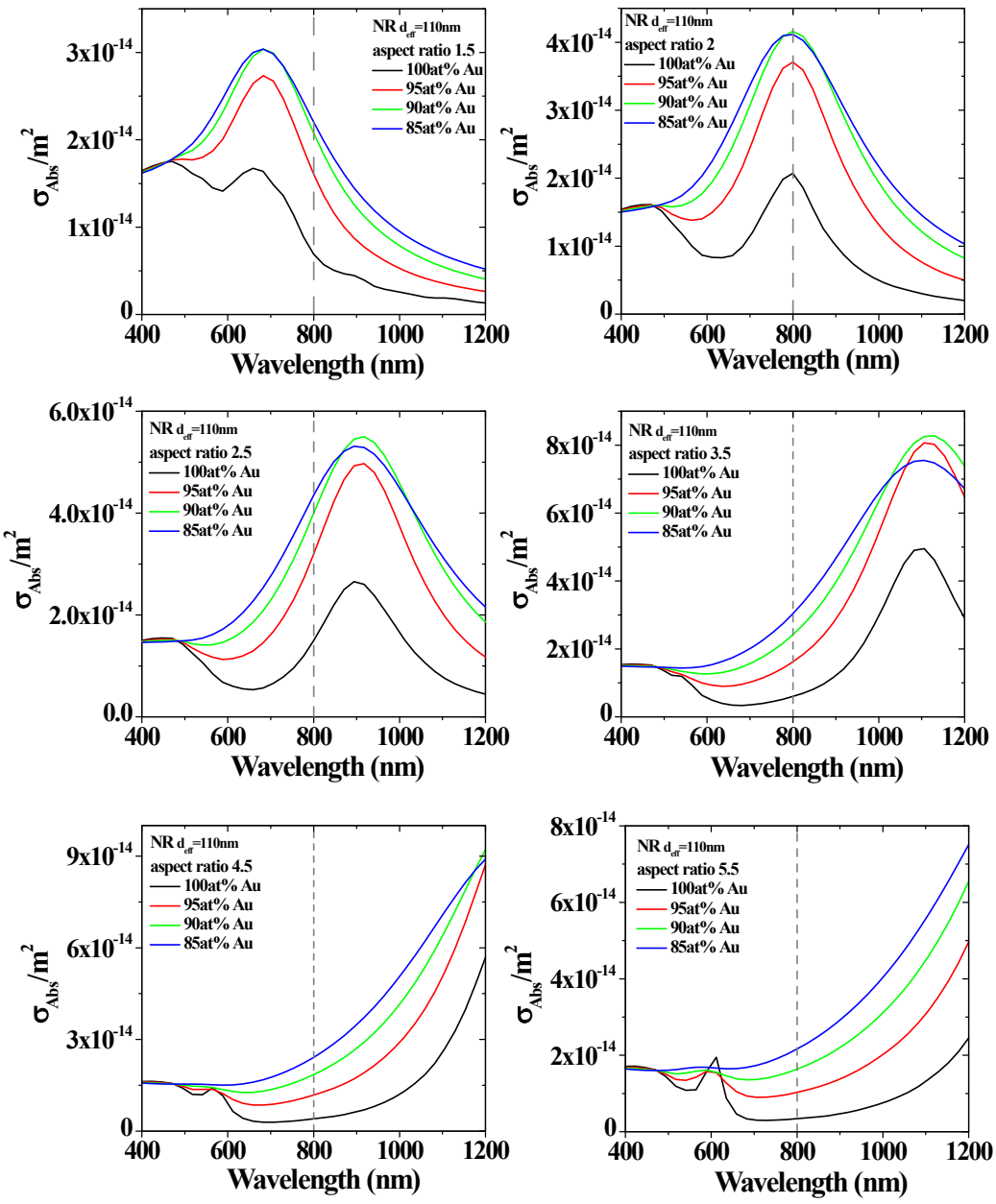

Figure S8. DDA calculations of σ_{Abs} in iron-doped hemispherical NRs with constant size of 110nm and variable aspect ratio.

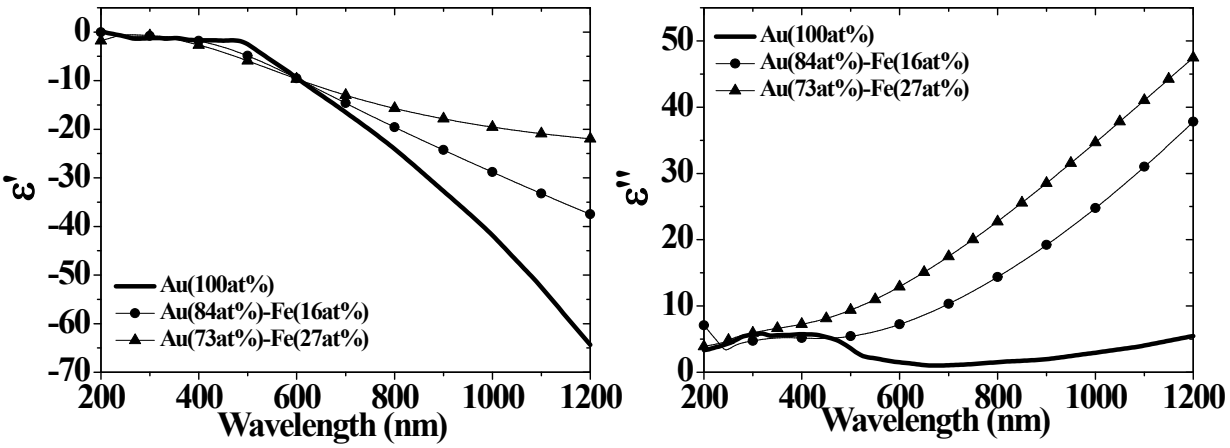

Figure S9. Experimentally measured optical constants for pure Au (black line), $Au_{84}Fe_{16}$ (circles) and $Au_{73}Fe_{27}$ (triangles) alloys (for details see experimental section).

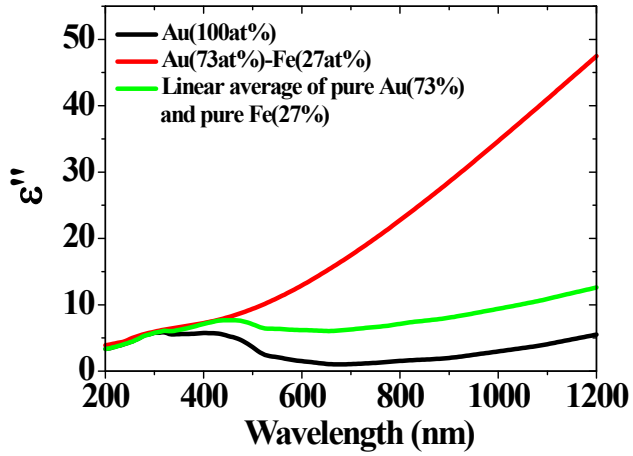

Figure S10. Comparison of experimentally measured ε'' for pure Au (black line) and $Au_{73}Fe_{27}$ alloys (red) with the linear average of ε'' taken from pure Au (73%) and pure Fe (27%). The experimental ε'' of the alloy is remarkably larger than the linearly weighted average of ε'' taken from the two pure metals, showing that modification of the ε'' is not given just by the sum of *d*-level transitions of Fe with those already present in Au.