Electronic Supplementary Information

A fifteen atom silver cluster confined in bovine serum albumin

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Supplementary information 1

pH dependence on the stability of cluster and MALDI MS of control experiments performed to verify the formation of Ag_{15}@BSA

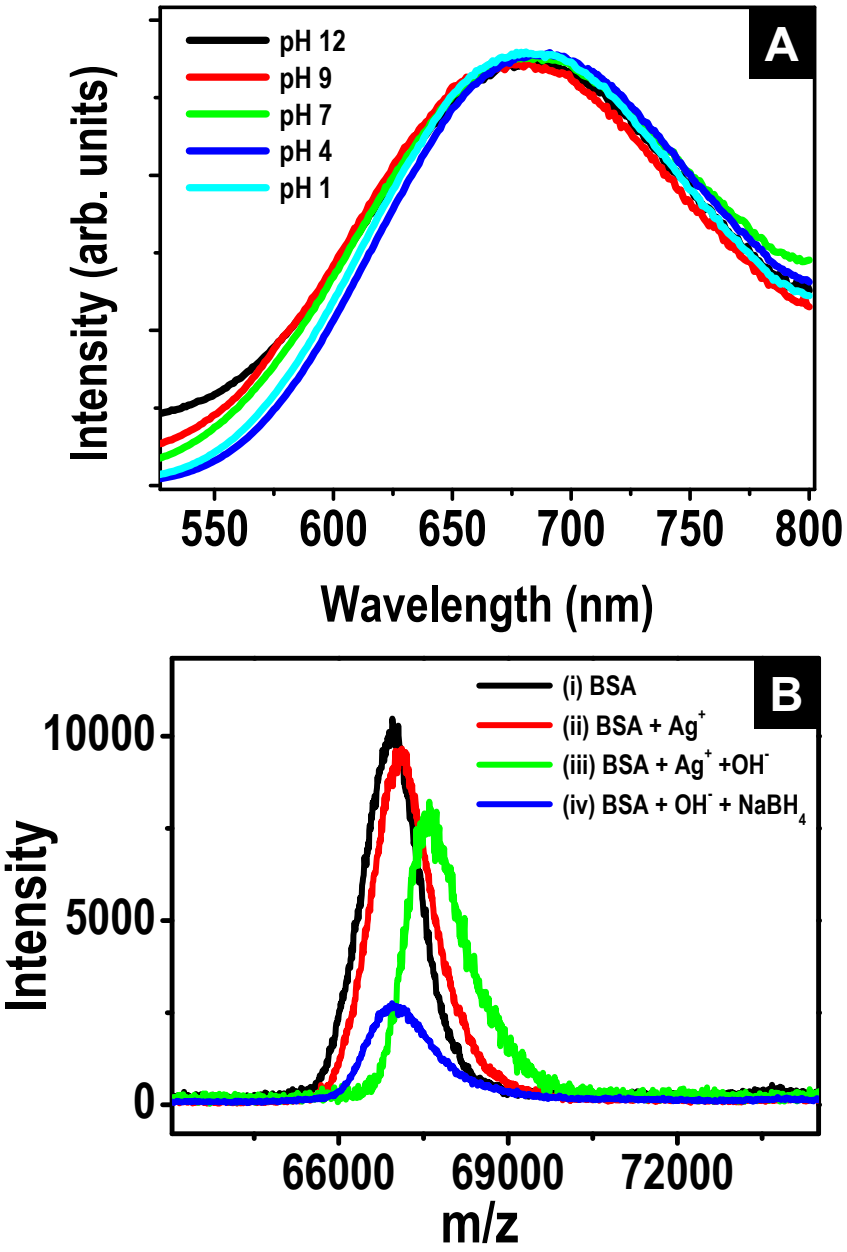

Figure S1. (A) Emission spectra of Ag_{15}@BSA at different pH (measured after 10 min of preparing the solutions). (B) Positive ion MALDI MS of the various control experiments performed to validate the formation of Ag_{15}@BSA. (i) Pure BSA (black trace), (ii) mixture of BSA and $AgNO_3$ (red trace), (iii) mixture of BSA, $AgNO_3$ and NaOH (green trace) and (iv) mixture of BSA, NaOH and $NaBH_4$ (blue trace).

Supplementary information 2

XPS spectrum of Ag_{15}@BSA in the Ag 3d region

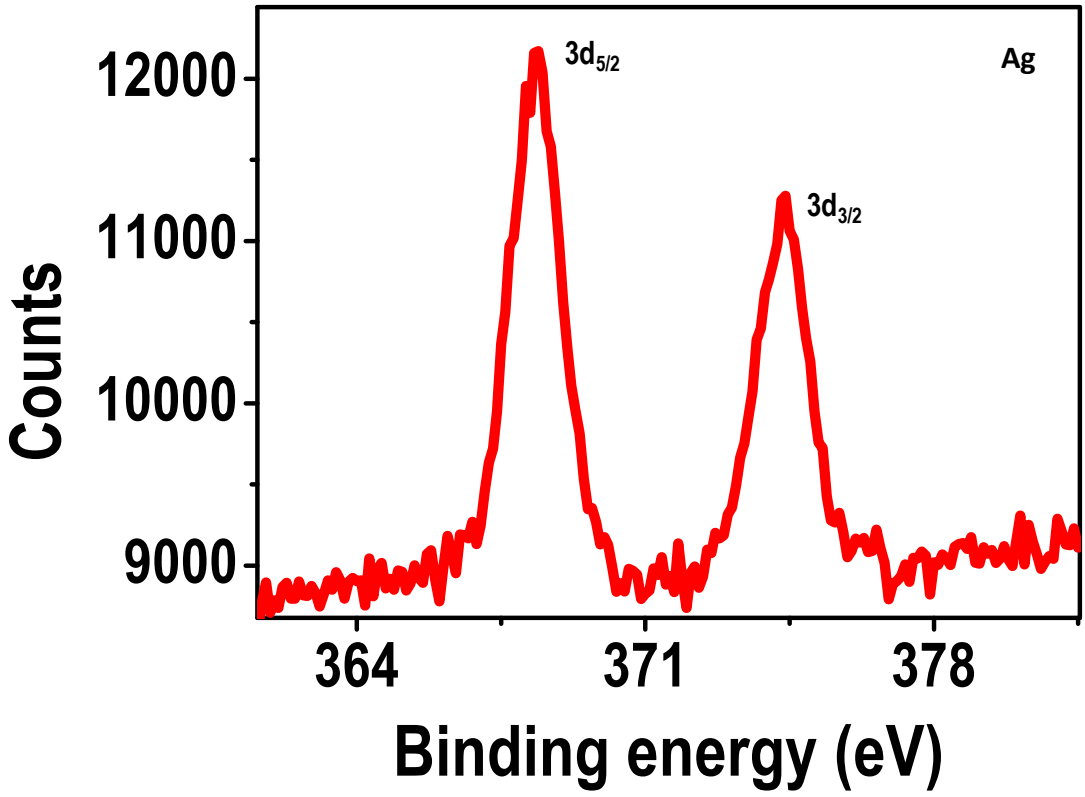

Figure S2. XPS spectrum of Ag_{15}@BSA in the Ag 3d region.

Supplementary information 3

Luminescence profile of solid Ag_{15}@BSA

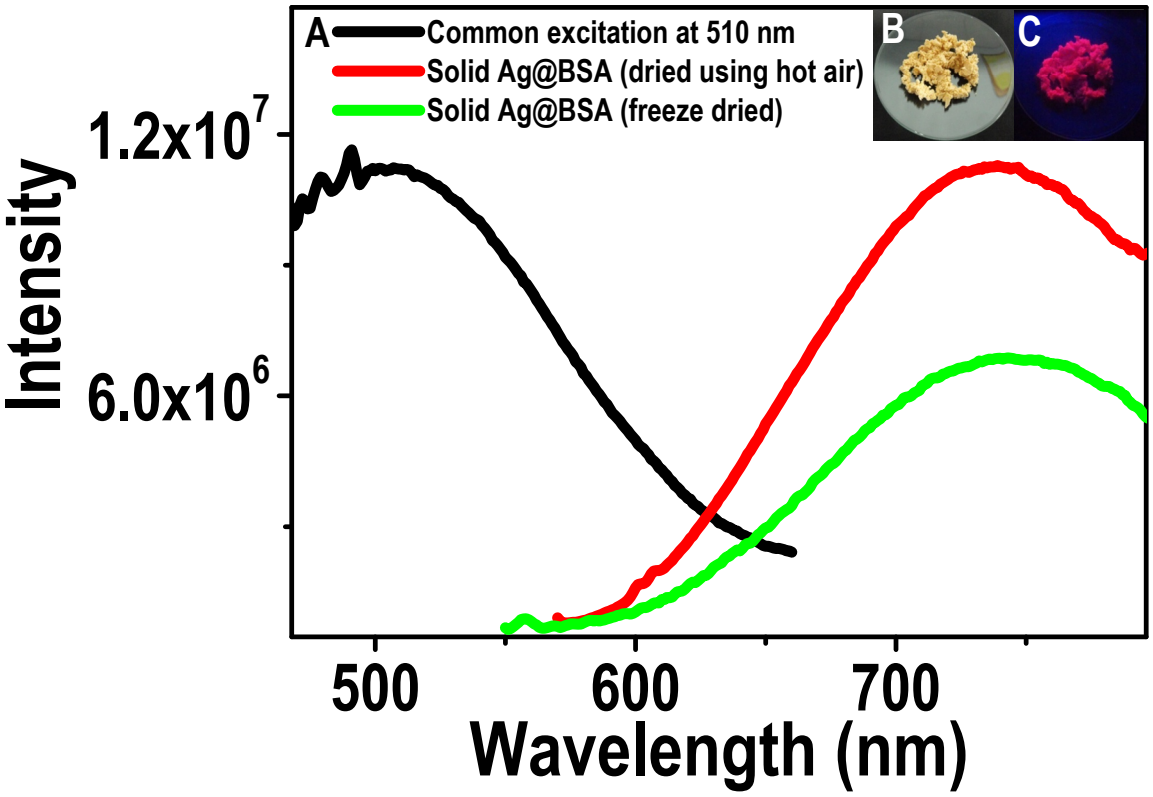

Figure S3. (A) Luminescence profile of red emitting solid of Ag_{15}@BSA showing an excitation at 510 nm (black trace) and an emission at 740 nm. The red trace corresponds to the solid cluster prepared under flowing hot air and the green trace corresponds to cluster prepared by freeze drying. (B) and (C) are the photographs of the freeze dried cluster under visible light and UV light, respectively.

Supplementary information 4

Fluorescence lifetime data of Ag_{15}@BSA

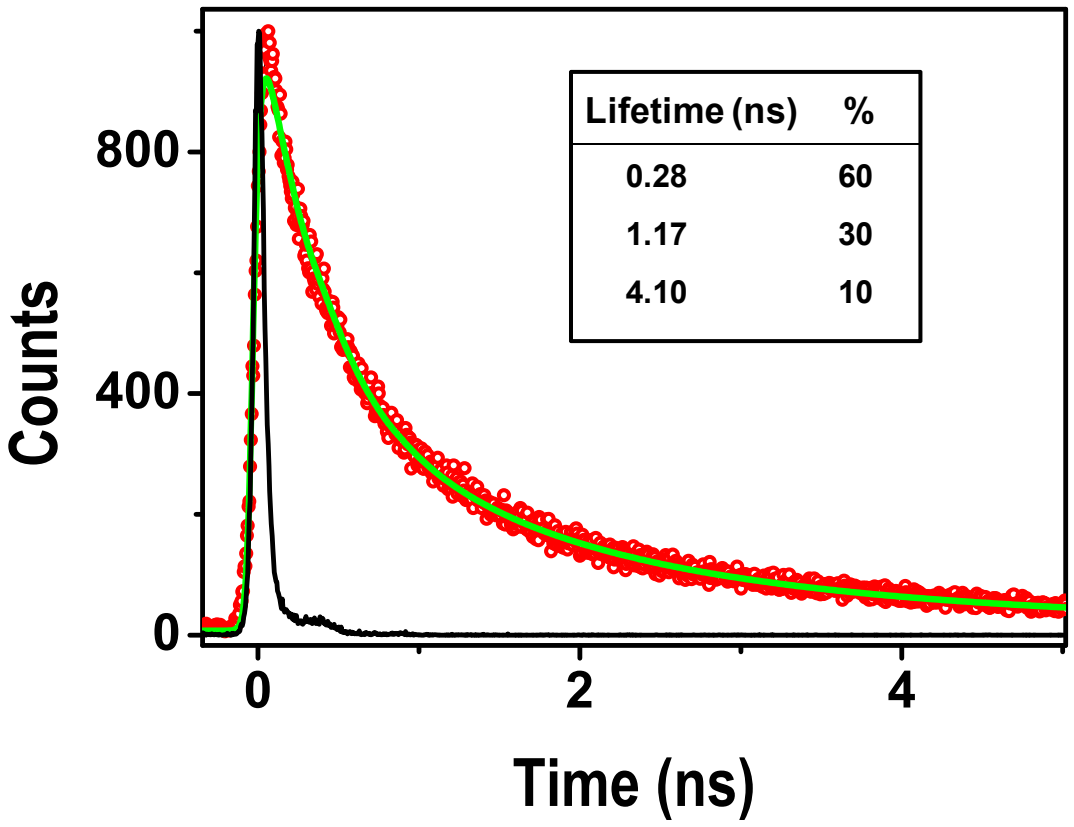

Figure S4. Fluorescence decay of Ag_{15}@BSA. Lifetime values obtained are given in the inset. The instrument response function (IRF, in black) shows a resolution of 80 ps.

Supplementary information 5

Effect of solvents on the formation of Ag_{15}@BSA

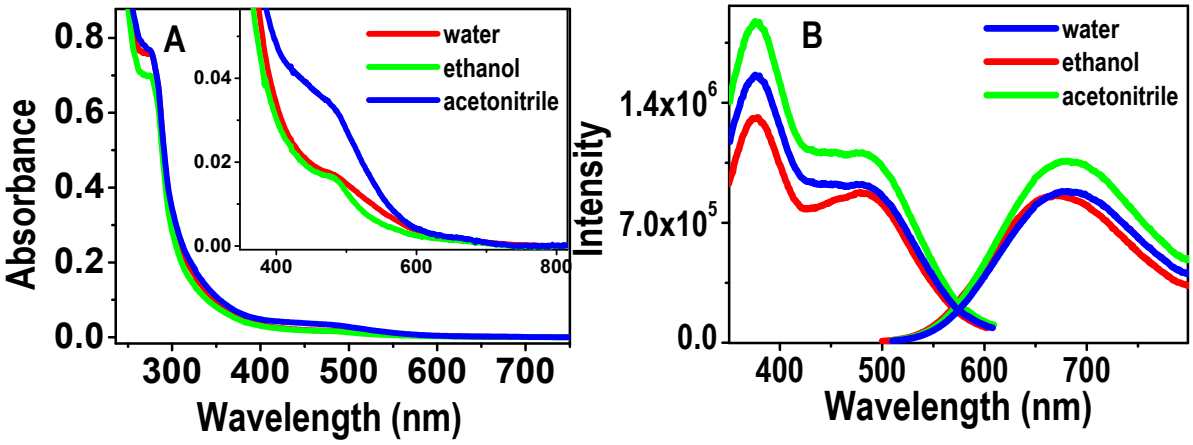

Figure S5. Effect of solvents on the synthesis of red emitting Ag_{15}@BSA. (A) UV-vis absorption spectra of the cluster solutions prepared using water (red trace), ethanol (green trace) and acetonitrile (blue trace) as the solvents. (B) Luminescence profile of the cluster solutions in water (blue trace), ethanol (red trace) and acetonitrile (green trace).

Supplementary information 6

Decomposition of Ag_{15}@BSA at 28 °C and at 10 °C

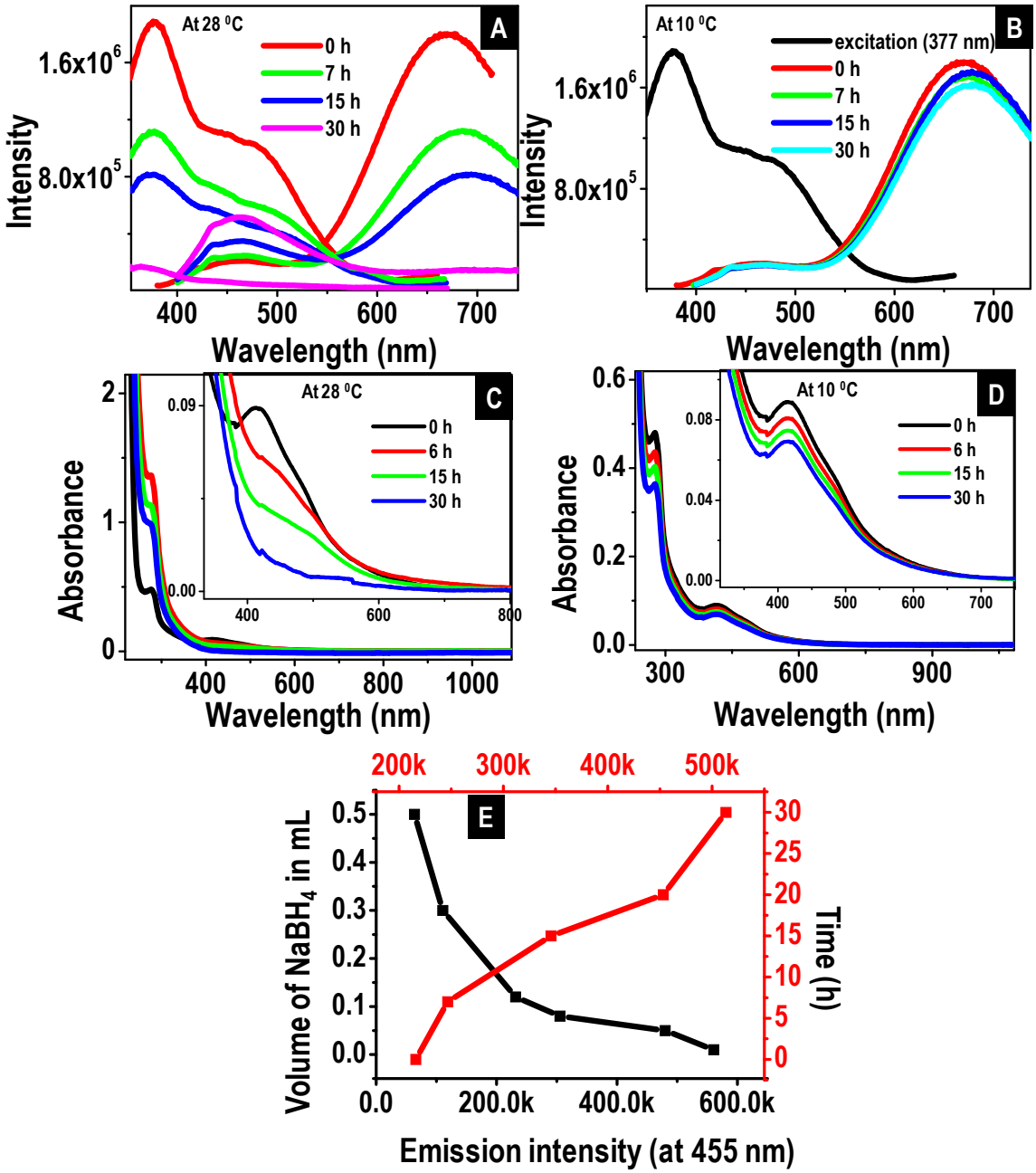

Figure S6. Luminescence profiles (A and B) and UV-vis absorption spectra (C and D) for the decomposition of red emitting Ag_{15}@BSA. (A) and (C) correspond to solutions kept at room temperature (28 °C) and (B) and (D) for that at low temperature(10 °C). (E) Plot of emission intensity of the feature at 455 nm (Ag-BSA conjugate) versus amount of $NaBH_4$ added (during the formation of clusters (black trace)) and with time (during room temperature decay of clusters (red trace)).

Supplementary information 7

MALDI MS analysis of decomposition of Ag_{15}@BSA at room temperature (28 ^{o}C) and at a low temperature (10 ^{o}C)

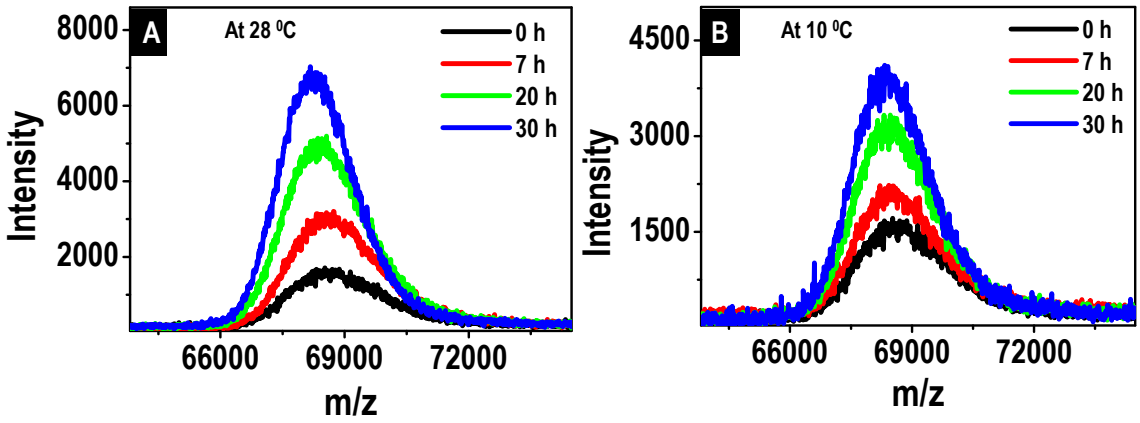

Figure S7. Positive ion MALDI-TOF mass spectra of the decomposition of Ag_{15}@BSA cluster when incubated at 28 ^{o}C (A) and at 10 ^{o}C (B), respectively.