

## Electronic Supplementary Information

### Clusters protected with mixed proteins exhibiting intense photoluminescence

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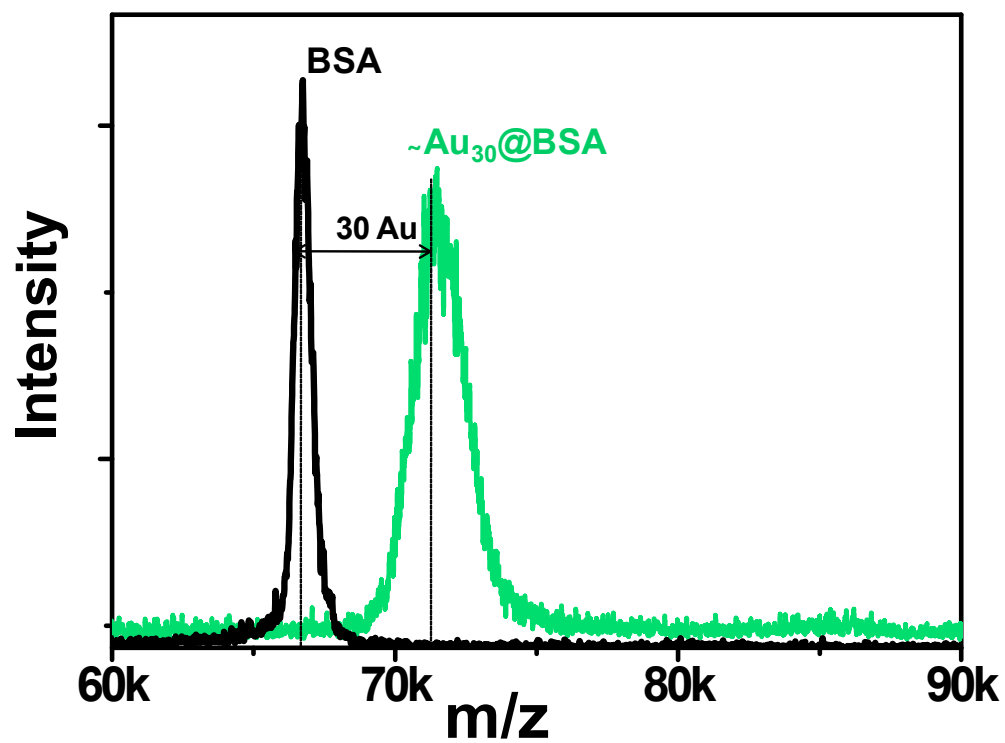
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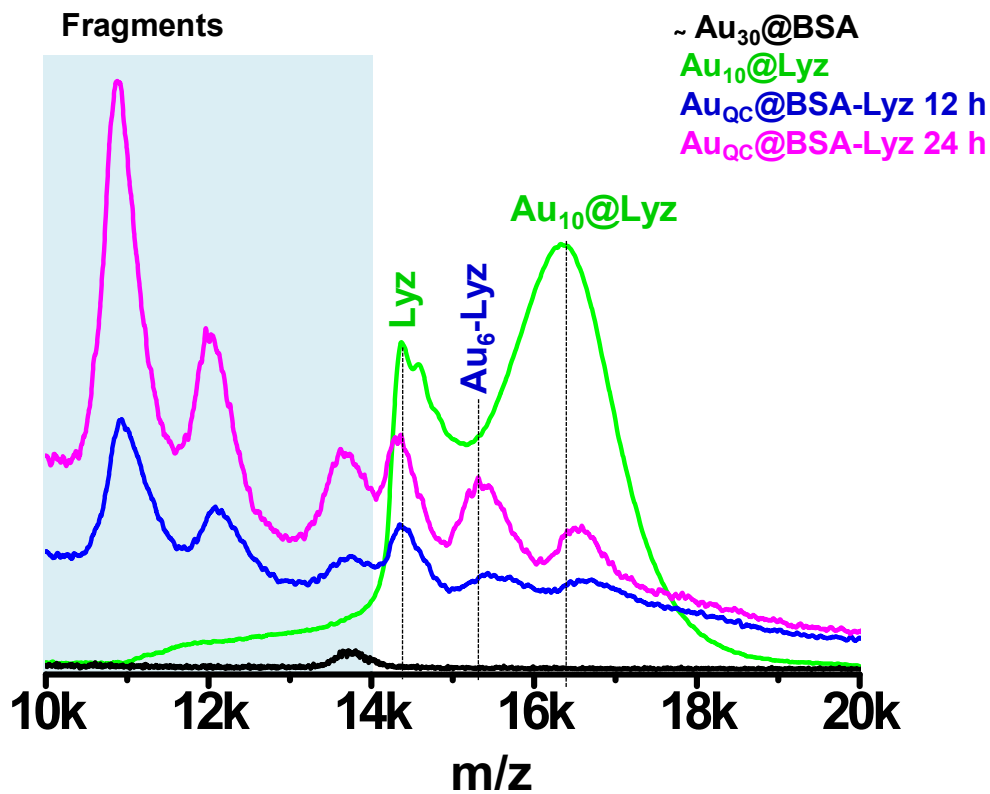
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Electronic Supplementary Information 1



**Figure S1:** Comparative MALDI MS of BSA and Au<sub>QC</sub>@BSA showing mass shift of 6 kDa from parent protein after cluster formation. The cluster is assigned as ~Au<sub>30</sub>@BSA.

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**Figure S2:** Comparative MALDI MS of  $\sim\text{Au}_{30}\text{@BSA}$ ,  $\text{Au}_{10}\text{@Lyz}$  and  $\text{Au}_{\text{QC}}\text{@BSA-Lyz}$  at lower mass region showing a few Au attachments to Lyz along with other fragments.

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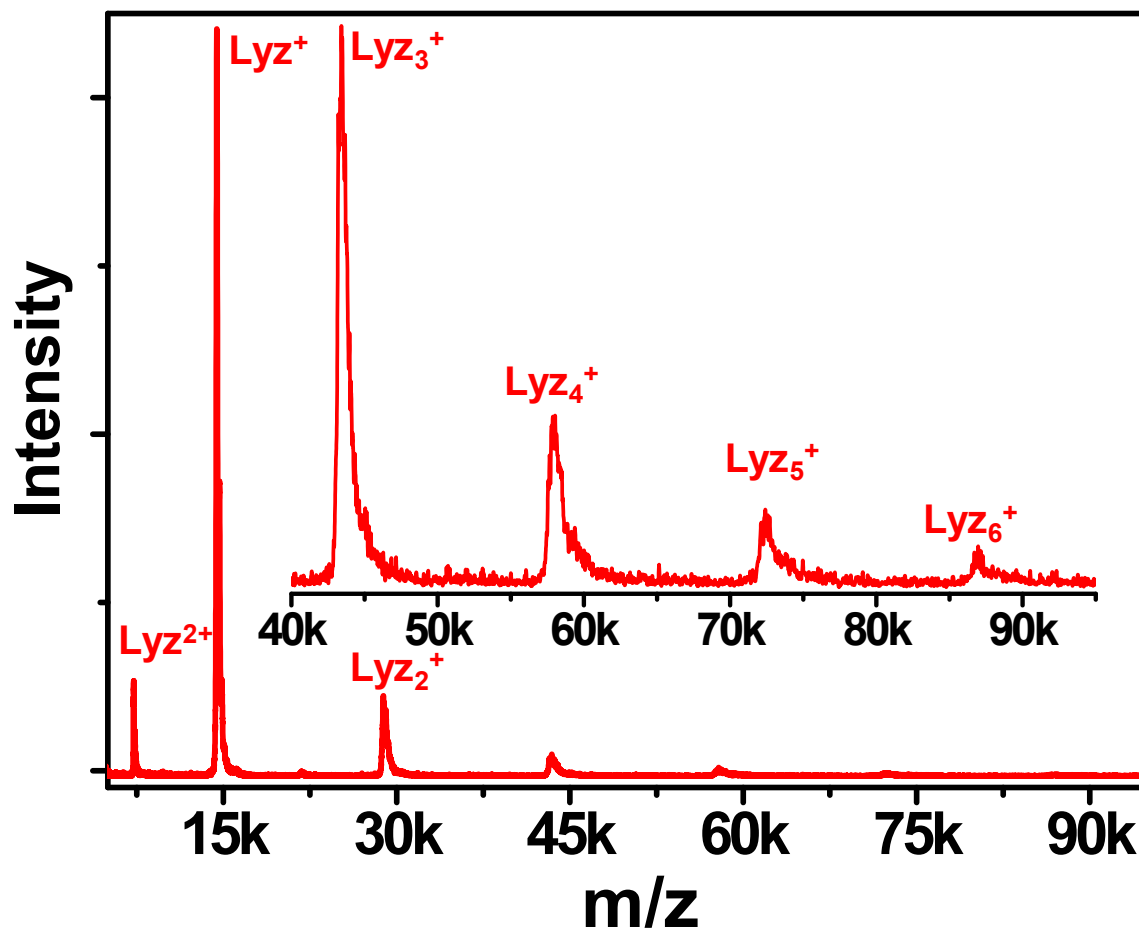
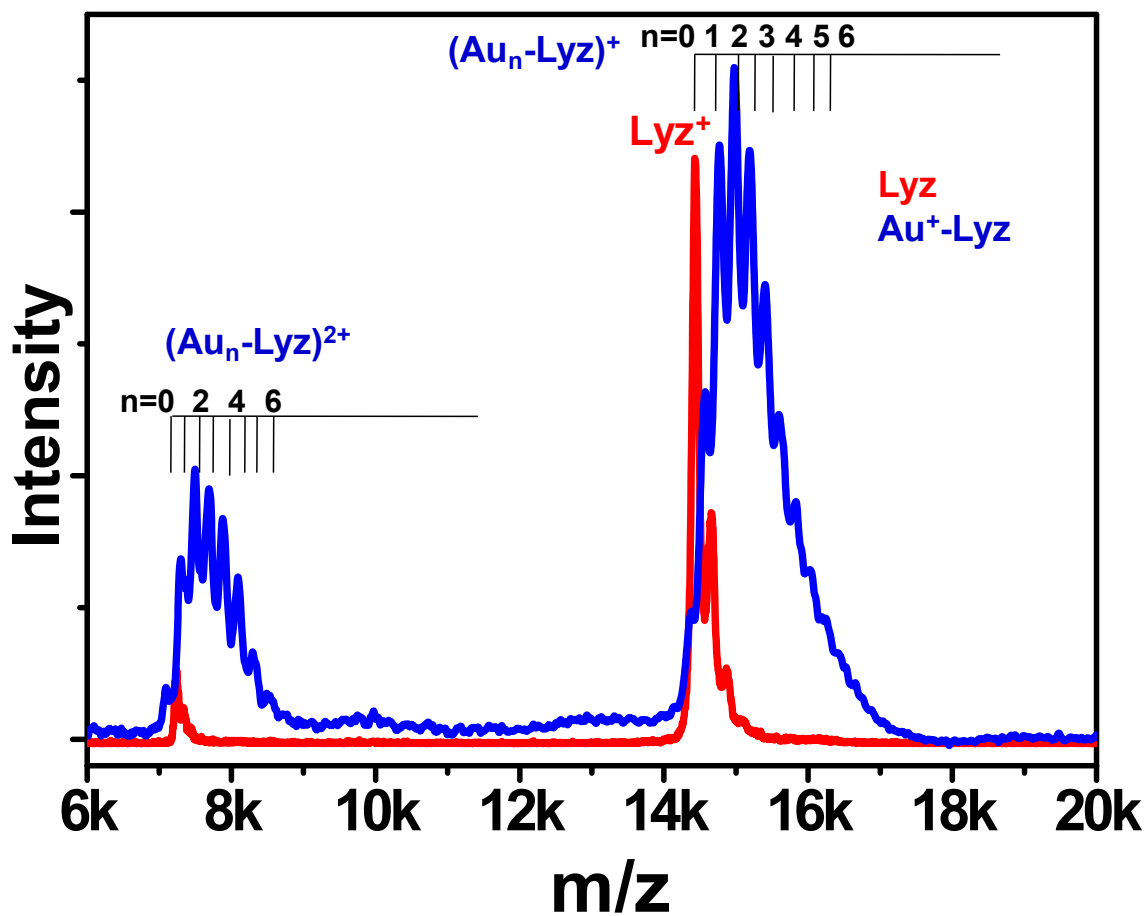


Figure S3: MALDI MS of Lyz is showing aggregate formation. Up to hexamer is clearly visible.

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**Figure S4:** MALDI MS of  $\text{Au}^+-\text{Lyz}$  adduct showing multiple Au attachments to the parent protein with a separation of  $m/z$  197 due to Au. Corresponding double charge state was also observed with  $m/z \sim 99$  separation due to  $\text{Au}^{2+}$ .

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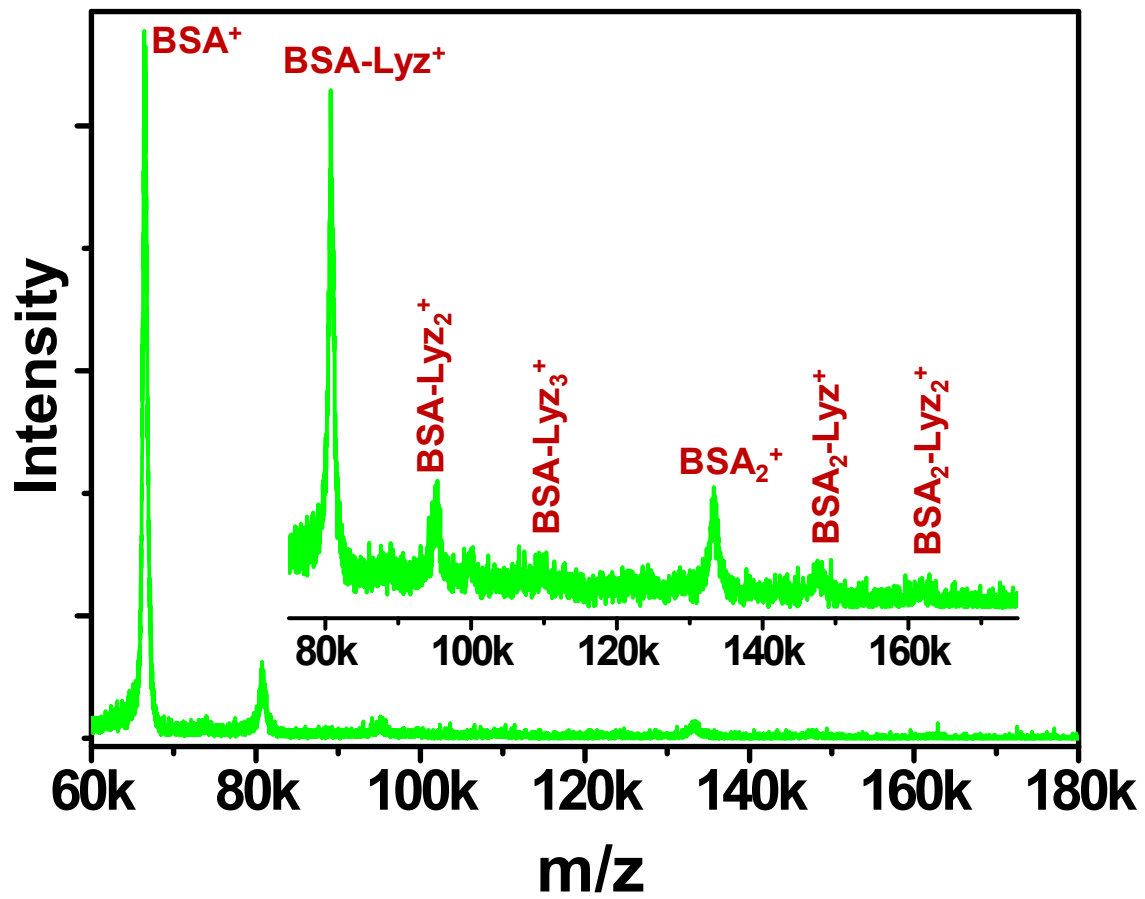
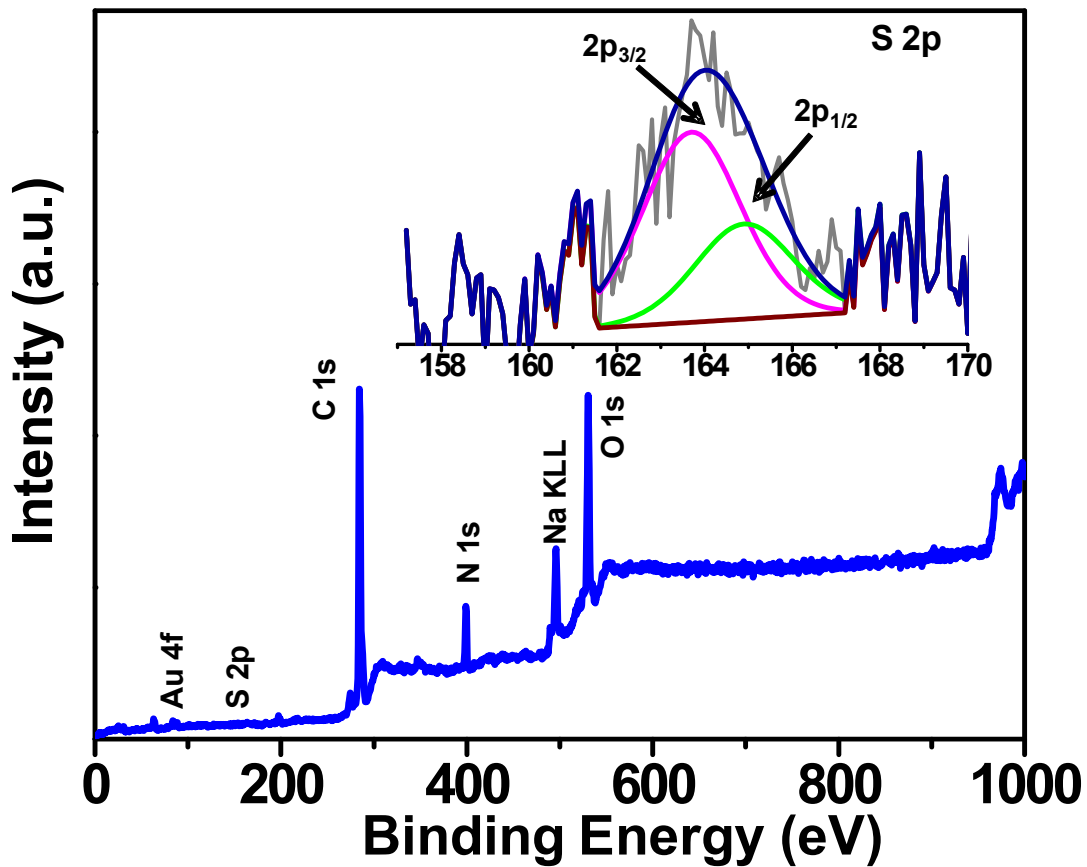
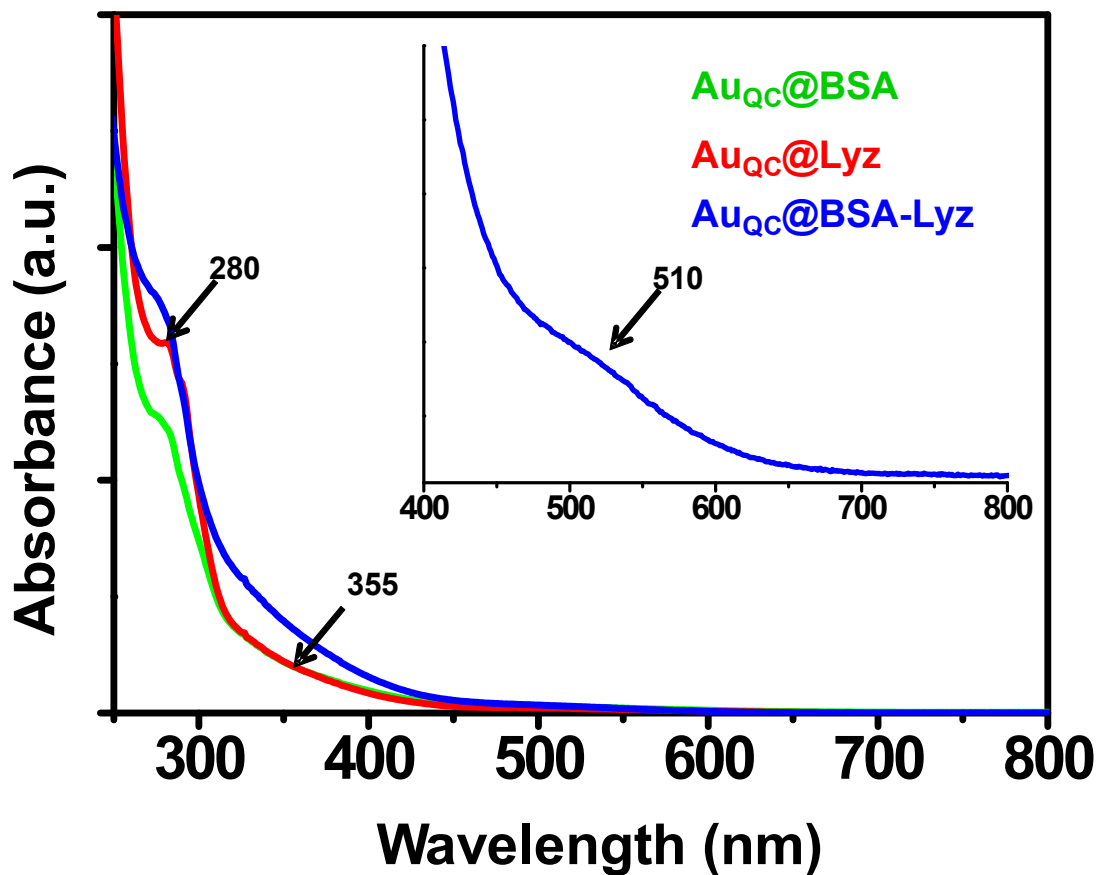


Figure S5: MALDI MS of BSA-Lyz is showing aggregate formation between two proteins.

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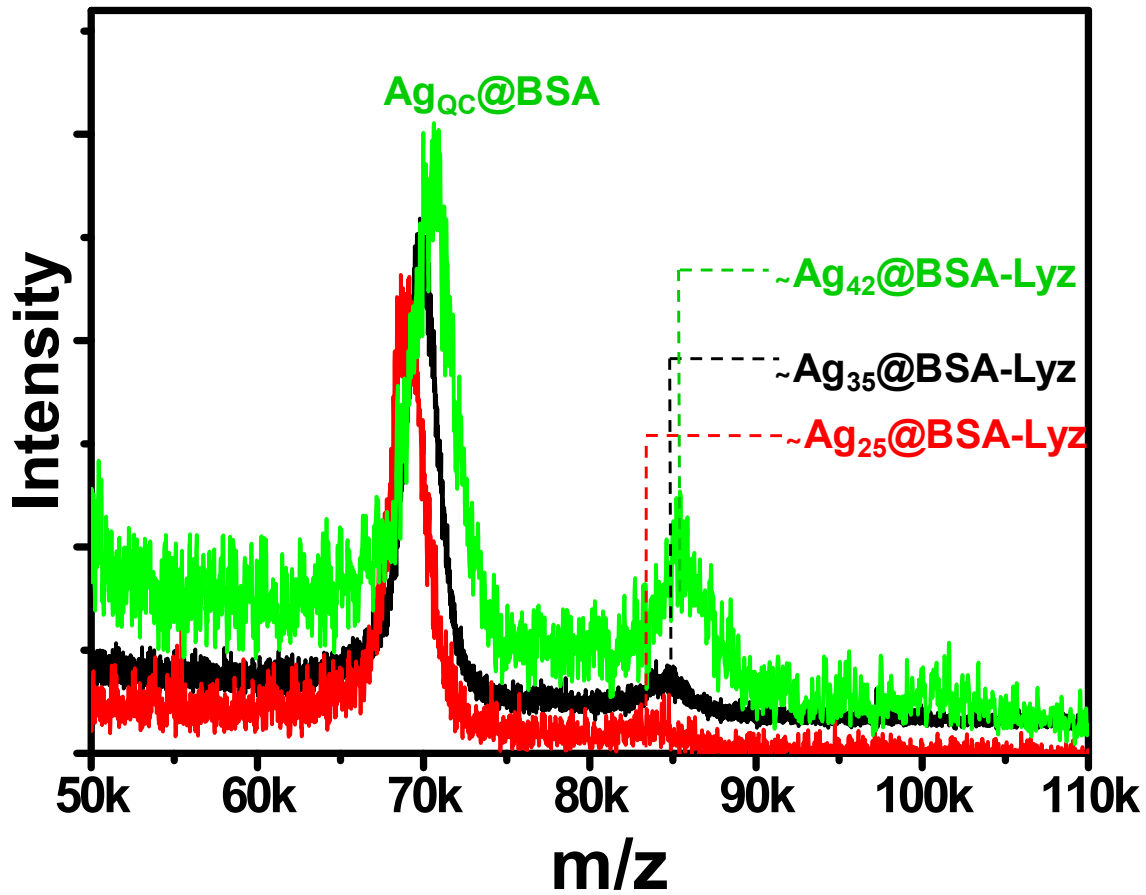
**Figure S6:** XPS survey spectrum of Au<sub>QC</sub>@BSA-Lyz is showing the presence of respective elements. The S 2p region is expanded in the inset.



**Figure S7:** UV-Vis absorption spectra of Au<sub>QC</sub>@BSA-Lyz is showing a hump at 510 nm which was originally absent for individual clusters, ~Au<sub>30</sub>@BSA and Au<sub>10</sub>@Lyz.



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**Figure S8:** Concentration dependent MALDI MS of  $Ag_{QC}@BSA-Lyz$  showing linear dependence of Ag concentration and number of core Ag atoms.