**Supporting Information: Structural determination of Enzyme-Graphene Nanocomposite Sensor Material**

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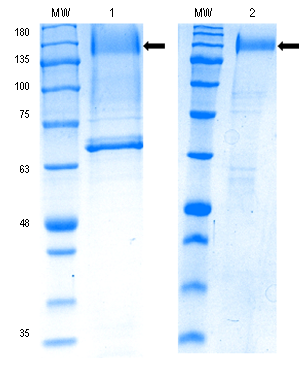
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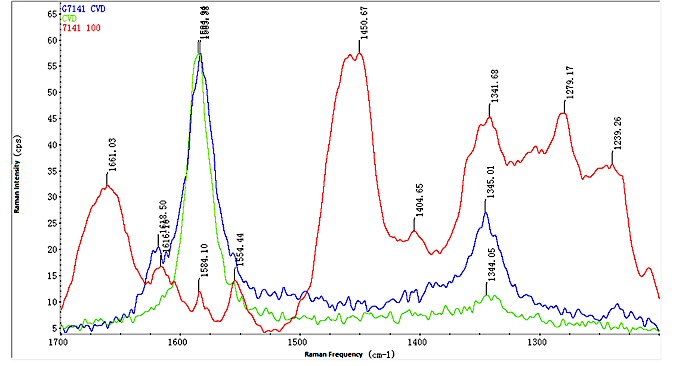
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*Inspired by Varun, Suraj*

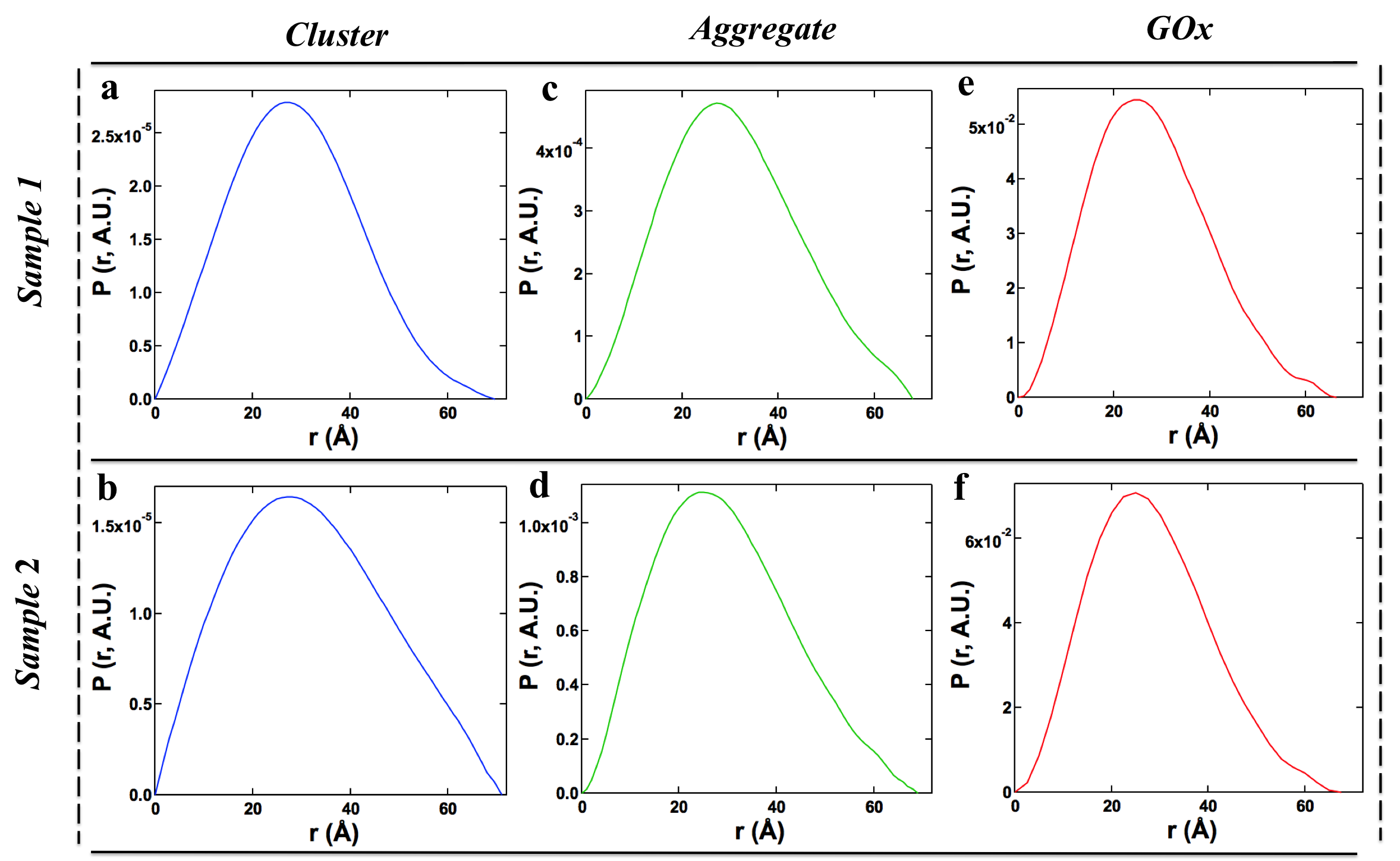
**Supporting Figures:**



***Figure S1:*** *Coomassie blue stained SDS-PAGE analysis of the Aspergillus niger glucose oxidase. Protein is highly glycosylated and migrates as a broad band indicated by an arrow. Lane 1, Medium Grade Recombinant GOx (produced by Klyuveromyces marxianus); lane 2, High Grade Recombinant GOx (Produced by Klyuveromyces marxianus); MW, molecular-weight size marker. Each lane contains 3µg of total protein.*



***Figure S2:*** *Raman spectrum of GOx immobilized on single layer graphene (SLG, GT141 CVD) collected at ~ pH 7 (blue), after subtraction of SLG (CVD).*



***Figure S3****: Probability distribution, P(r), plots using equation (12) for (a) sample 1 and (b) sample 2 GOx dimers; (c) sample 1 and (d) sample 2 aggregates and (e) sample 1 and (f) sample 2 clusters.*

***Table S1:*** *Statistical details of the ab-initio modeling using ATSAS package.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Sample* | *Level* | *NSD\**  *(Std Deviation)* | *Reconstructions included by DAMAVER* | *Dmax (GNOM, Å)* | *Dmax (DAMAVER, Å)* |
| *1* | *GOx* | *0.58*  *(±0.06)* | *18/20* | *69.6* | *69.2* |
| *Aggregate* | *0.69*  *(±0.06)* | *19/20* | *68* | *71.6* |
| *Cluster* | *0.480*  *(±0.007)* | *19/20* | *66.5* | *76.3* |
| *2* | *GOx* | *0.66*  *(±0.12)* | *18/20* | *71* | *72.7* |
| *Aggregate* | *0.87*  *(±0.04)* | *18/20* | *69* | *75.7* |
| *Cluster* | *0.488*  *(±0.007)* | *20/20* | *67.5* | *78.7* |

*\*Normalized spatial discrepancy (NSD)*