

## Supporting Information

### **Signature of the Surface Hydrated Proton and Associated Restructuring of Water at the Model Membrane Interfaces: Vibrational Sum Frequency Generation Study**

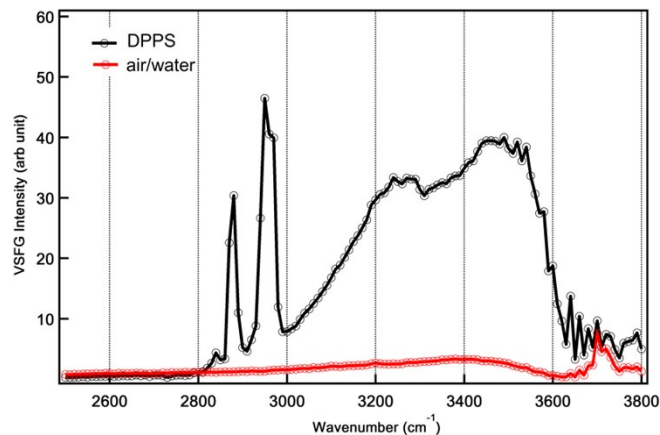
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School of Chemical Sciences,

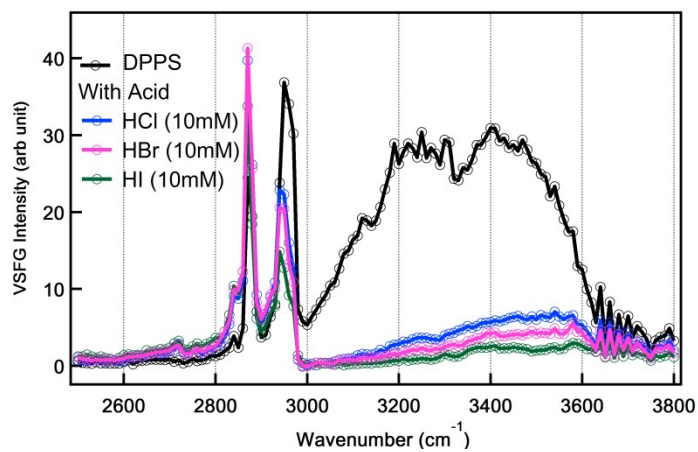
Indian Association for the Cultivation of Science,

Jadavpur, Kolkata, 700032

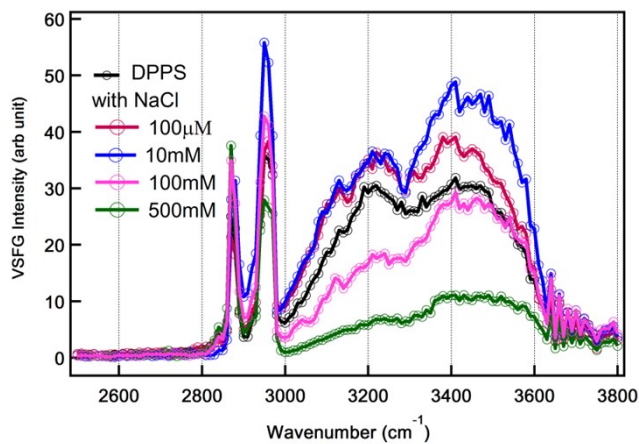
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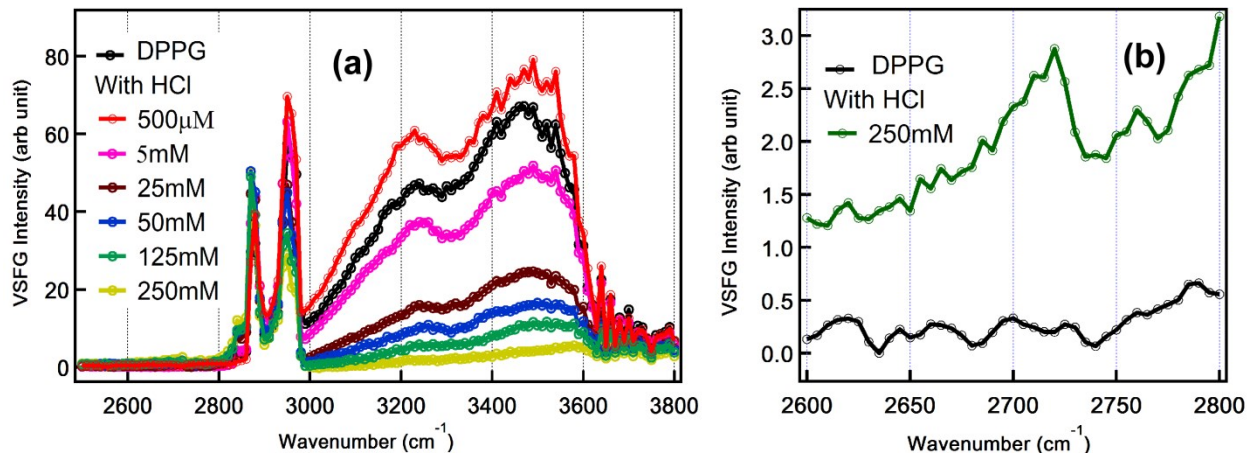
**Figure S1:** The VSGF spectra of air/water and negatively charged air/DPPS/water interfaces.



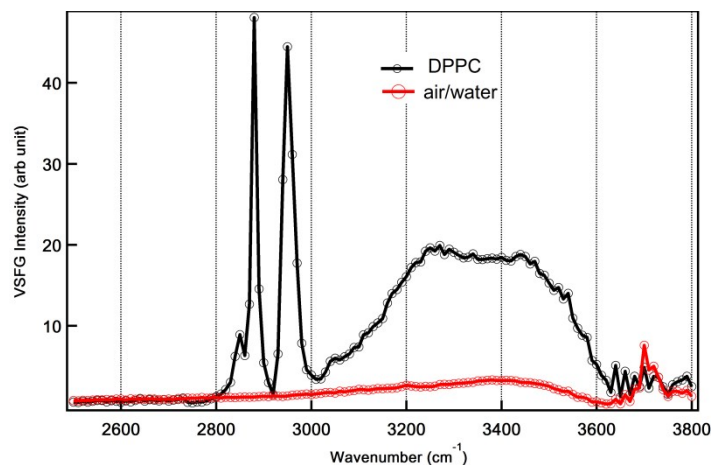
**Figure S2:** The VSGF spectra of negatively charged air/DPPS/water interface in the presence of 10 mM of HCl, HBr and HI, respectively.



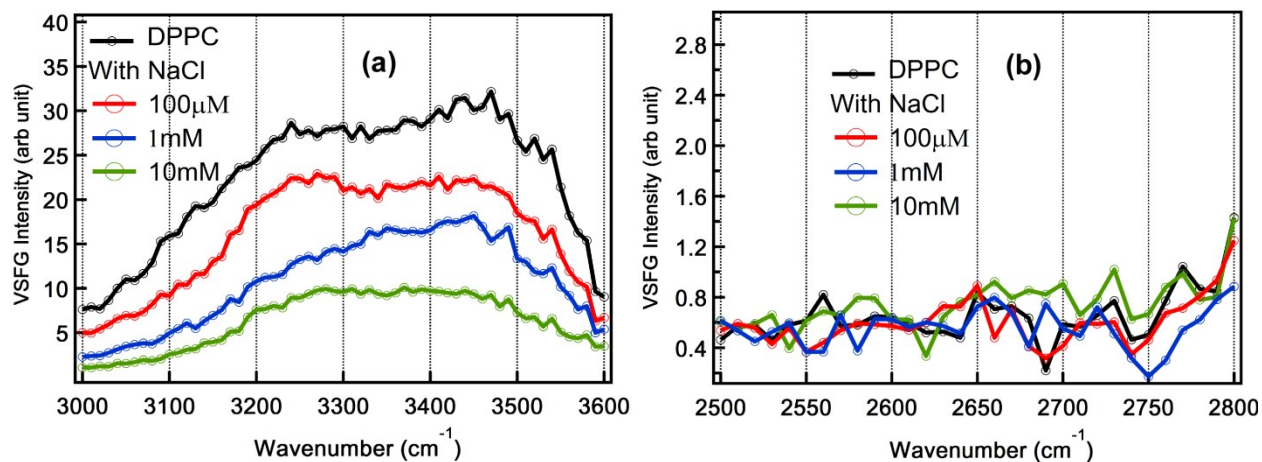
**Figure S3:** The VSG spectra of negatively charged air/DPPS/water interface in the presence of different concentrations of NaCl.



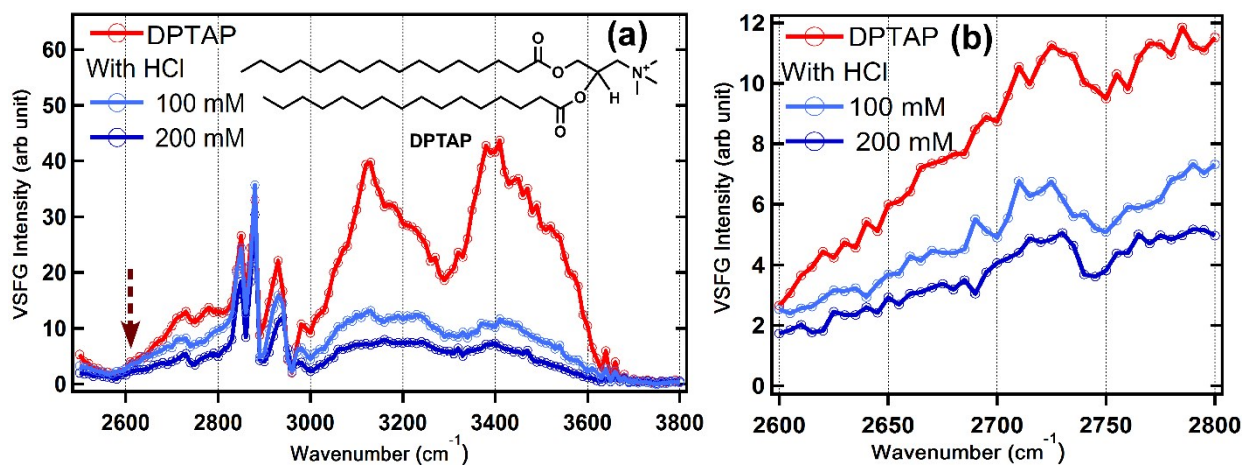
**Figure S4:** (a) The VSG spectra of the negatively charged air/DPPG/water interface on the addition of the different concentrations of HCl. (b) The VSG spectra of the negatively charged air/DPPG/water interface in the absence and presence of 250 mM of HCl measured with slower scan rate in the range of 2600-2800 cm<sup>-1</sup>, depicting the signature of the protonated water at DPPG interface.



**Figure S5:** The VSGF spectra of air/water and zwitterionic air/DPPC/water interfaces.



**Figure S6:** (a) The VSGF spectra of the OH stretch of water at the zwitterionic air/DPPC/water interface on the addition of the different concentrations of NaCl. (b) The VSGF spectra of zwitterionic air/DPPC/water interface on the addition of the different concentrations of NaCl in the range of 2500-2800  $\text{cm}^{-1}$ .



**Figure S7:** (a) The VSFG spectra of the positively charged air/DPTAP/water interface the absence and presence of 100 and 200 mM of HCl and (b) measured with slower scan rate in the range of 2600-2800 cm<sup>-1</sup>.