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Protonation of octadecylamine Langmuir monolayer by adsorption of halide counterions WOONGMO SUNG, ZAURE AVAZBAEVA, JONG-GWAN LEE, DOSEOK KIM, Sogang University — Langmuir monolayer consisting of octadecylamine ($C_{18}H_{37}NH_2$, ODA) was investigated by heterodyne vibrational sum-frequency generation (HD-VSFG) spectroscopy in conjunction with surface pressure-area (π - A) isotherm, and the result was compared with that from cationic-lipid (DPTAP) Langmuir monolayer. In case of ODA monolayer on pure water, both SF intensity of water OH band and the surface pressure were significantly smaller than those of the DPTAP monolayer implying that only small portion of the amine groups ($-NH_3^+$) is protonated in the monolayer. In the presence of sodium halides (NaCl and NaI) in the subphase water, it was found that the sign of $Im\chi^{(2)}$ of water OH band remained the same as that of the ODA monolayer on pure water, but there was a substantial increase in the SF amplitude. From this, we propose that surface excess of the halide counterions (Cl^- and I^-) makes the solution condition near the ODA monolayer/water interface more acidic so that ODA molecules in the monolayer are more positively charged, which works to align the water dipoles at the interface.

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