SURFACE STRUCTURE INVESTIGATION OF METHANOL AT THE AIR-LIQUID INTERFACE BY VIBRATIONAL BROAD BANDWIDTH SUM FREQUENCY GENERATION SPECTROSCOPY

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Methanol is an important oxygenated hydrocarbon in the upper troposphere. The surface structure of methanol at the air-liquid interfaces of neat methanol and aqueous methanol solutions were investigated using vibrational broad bandwidth sum frequency generation (BBSFG) spectroscopy. A red-shift of the CH_3 symmetric stretch (CH_3-SS) frequency with the increase of methanol concentration was observed by BBSFG, which suggests an evolving hydrogen bonding configuration between the methanol and the surrounding water molecules at the surface. BBSFG results also indicate that as the methanol concentration increases above 0.57 methanol mole fraction the methanol molecules at the surface become less ordered, e.g. a larger distribution of orientation angles of the CH_3-SS transition moment about the surface normal exists.