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VSFS studies of soluble monolayers formed by linear and branched alcohols at the air/water interface SÜLEYMAN CAN, DEESHA MAGO, ROBERT WALKER, Department of Chemistry and Biochemistry, University of Maryland — Vibrational Sum Frequency Spectroscopy (VSFS) was used to examine the molecular structure and organization of linear and branched octanol and nonanol monolayers adsorbed to the air/water interface. Vibrational bands in the CH stretching region – specifically the symmetric and antisymmetric normal modes of the methyl and methylene groups as well as bands resulting from Fermi Resonance interactions – were used to characterize molecular orientation. Complementing these studies were a full series of surface tension measurements designed to measure surface excess concentrations at full monolayer coverage. VSFS data show that branched alcohols attached to an odd carbon (such as 3-nonanol) create monolayers having very similar surface structures and surface coverages, regardless of where the alcohol functional group is attached. Functional substitution at an even-carbon (2-octanol), however, leads to a monolayer having expanded surface coverage (44 sq. Angstroms/molecule) but a surprisingly high degree of conformational order. These results are examined in terms of a competition between hydrogen bonding of the alcohol with the water sub-phase and the tendency of alkyl chains to pack together in close registry.

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