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Enantiospecific Interaction of Histidine with Planes of Single Crystalline alpha Quartz[1] DANISH FARUQUI, PAUL J. SIDES, VLADIMIR V. PUSHKAREV, ANDREW J. GELLMAN, Carnegie Mellon Univ — Chiral chemistry profoundly affects living organisms because they are homochiral environments. The origin of life itself trace to enantiospecific interactions. Chiral purity is an important scientific and technological goal. Adsorption of chiral compounds on 'powdered' quartz is sometimes enantioselective. Here we offer positive evidence of diastereomeric, chiral recognition at the interface between 'single crystal' alpha quartz and aqueous histidine and verification of the effect for three principal chiral crystallographic orientations of quartz. Characterizing the electrostatic environment, the zeta potential of (0001) L-quartz decreased by approximately 40 mV$\pm$5 as R-histidine was added incrementally to a concentration of 400 u molar; the zeta potential of the same L-quartz sample, however, decreased by only 20 mV$\pm$ 5 in an otherwise identical experiment with L-histidine Results of all diasteriomeric and control experiments on each plane were consistent, The zeta-potential provides evidence that adsorption on quartz is enantiospecific; is influenced by the chirality of quartz but not necessarily by the crystallographic orientation of the surface.

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