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Nanoscale Periodic Modulations on Sodium Chloride Induced by Surface Charges[1] KENDAL CLARK, SHENGYONG QIN, XIAOGUANG ZHANG, JOHN WENDELKEN, AN-PING LI, Oak Ridge National Laboratory — The sodium chloride surface is one of the most common platforms for the study of catalysts, thin film growth, and atmospheric aerosols. Here we report a nanoscale periodic modulation pattern on the surface of a cleaved NaCl single crystal, revealed by non-contact atomic force microscopy with a tuning fork sensor. The surface pattern shows two orthogonal domains, extending over the entire cleavage surface. The spatial modulations exhibit a characteristic period of 5.4 nm, commensurate with the atomic rows of the NaCl surface. The modulations are robust in vacuum, not affected by the tip-induced electric field or gentle annealing (<300 $^{\circ}$C); however, they are eliminated after exposure to water and an atomically flat surface can be recovered by subsequent thermal annealing after water exposure. A strong electrostatic charging is revealed on the cleavage surface and the modulations appear to reflect a surface structural reconstruction facilitated by surface charges.

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