Abstract Submitted
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Self-Alignment of Dimer Vacancies on Si(001)[1] ARIEF BUDIMAN, University of Calgary — A formation of single dimer vacancy line on a reconstructed Si(001) terrace can be understood from their interaction elastic energy and configuration entropy. Both reconstructed terrace and dimer vacancies are represented by elastic dipoles. A grand canonical ensemble is used to analyze four possible alignments of a dimer vacancy line on such terrace. The self-organization is induced by an elastic interaction between the dimer vacancy and the reconstructed terrace and a kinematic restriction for a line to have a maximum length equal to terrace width when aligned perpendicular to the step direction. Numerical simulations using the obtained energy expression also reveal the importance of elastic interaction in inducing motion of dimer vacancies, while their self-alignment to forming a line is assisted by chemical bond between nearby dimer vacancies.

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