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Kinetic compensation effect in thermal desorption NAYELI ZUNIGA-HANSEN, Austin Peay State University, LEONARDO E. SILBERT, Southern Illinois University Carbondale, MERCEDES CALBI, University of Denver — The parameters which characterize the rates of many thermally activated processes are often extracted using the Arrhenius equation. A series of closely related thermally activated processes exhibit systematic variations in the energies of activation, Ea, and preexponential factor, ?, in response to a perturbation, which leads to the concept of 'kinetic compensation', such that the different parameters in the Arrhenius equation balance each other out thereby leading to an implicitly assumed constant rate. However, the compensation effect has not been generally demonstrated and its origins are not completely understood. Using kinetic Monte Carlo simulations on a model interface, we explore how site-adsorbate and adsorbate-adsorbate interactions, and surface structural changes influence surface coverage and the kinetic parameters during a typical temperature programmed desorption process. We find that the concept of the compensation effect for interacting species breaks down and the time characterizing desorption increases with increasing interaction strength due to an increase in the effective activation energy. At the 'molecular' level the changes are the result of enhanced site correlations with increasing adsorbate interaction strength suppressing the onset of desorption.

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