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**Surface defects activate new reaction paths: formation of formate during methanol oxidation on defective Ru(0001)** I. PALACIO, O. RODRÍGUEZ DE LA FUENTE, Complutense University Madrid-SPAIN — An optimum understanding of the existing molecular mechanisms taking place while reactions occur on surfaces, should preferably be based on a correct identification of the intermediate species and the reaction paths, so to avoid trial-and-error approaches. Otherwise, a good control of the chemical activity is not easily attainable. We have adsorbed methanol on Ru(0001), with surfaces having a variable density of defects. In this way, with Auger Electron Spectroscopy (AES), Low Energy Electron Diffraction (LEED) and Infrared Reflection-Absorption Spectroscopy (IRAS) we have identified reaction paths in the methanol/Ru(0001) system. While the sole methanol adsorption leads to its complete dehydrogenation towards CO, we show that oxygen coadsorption stabilizes intermediate products, namely methoxy ($CH_3O$), formaldehyde ($CH_2O$) and formyl (CHO). We show as well that a new reaction path appears just on the defective surface: the formation of formate (HCOO). The presence of the defects (mainly steps) catalyzes the oxidation of formaldehyde to formate. This particular case shows how surface defects profoundly affect the catalytic activity, opening new reaction channels which are not available when the density of defects is low.

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