Supplementary Information

Low-temperature oxidation of ethanol to acetaldehyde over Mo-based catalysts

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Supplementary Figure

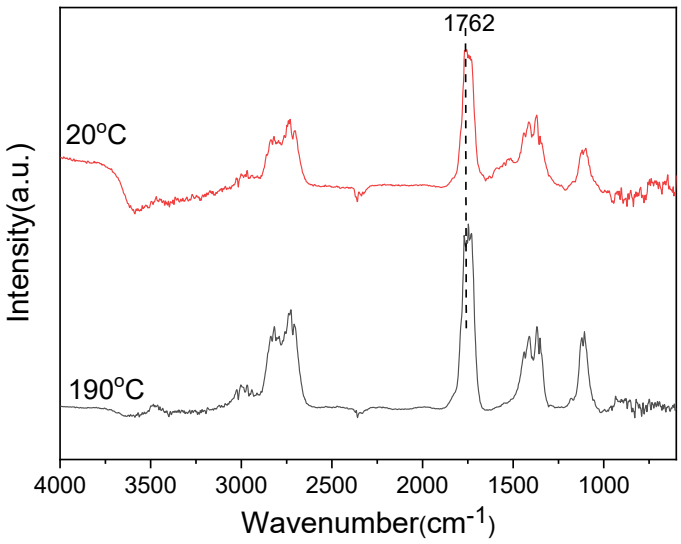

Fig. S1 Infrared spectra of acetaldehyde gas at different temperatures on Mo-Sn catalysts.

When comparing to the standard spectrum of acetaldehyde, the absorption peak at 1762 cm^{-1} ($\nu_{C=O}$) is indeed higher. To qualitatively analyze this characteristic absorption peak, we tested the infrared spectrum of acetaldehyde gas at different temperatures (Fig. S1). From the figure, it is clear that the characteristic absorption peak of $\nu_{C=O}$ is indeed located at a higher wavenumber position.

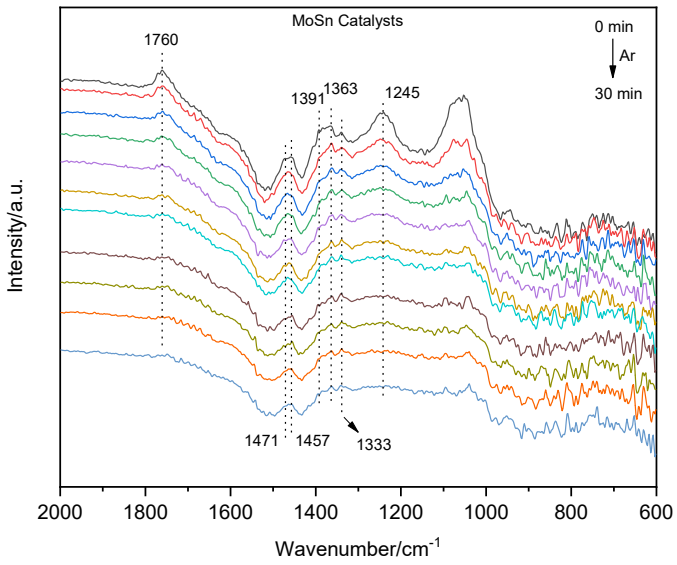

Fig. S2 After surface saturation adsorption of ethanol on Mo-Sn catalyst, Ar purge spectrum.

Fig. S2 shows the spectrum of the Mo-Sn catalyst surface after saturated adsorption of ethanol followed by Ar purging. As can be seen from the graph, with the Ar purge, the absorption peak at 1762 cm^{-1} quickly disappears, along with the characteristic absorption peak at 1391 cm^{-1}. Therefore, the characteristic peaks at 1762 and 1391 cm^{-1} should be attributed to acetaldehyde. Additionally, the characteristic peaks at 1471, 1457, 1363, and 1333 cm^{-1} did not disappear with Ar purging, indicating that they are characteristic absorption peaks of species adsorbed on the catalyst surface.