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Answer to the Letter by Bredikhin and Lokhov

Dear Sir,

Bredikhin and Lokhov present a couple of very high quality spectra and, by that, substantially broaden the existing literature. The authors think that their data are at variance with the conclusions in our paper (Ref. *1*) but actually the data confirm our results and conclusions.

Figure 1 in the paper by Bredikhin and Lokhov shows the following:

(i) According to the segment A, the highest frequency peak at 2097 cm^{-1} shifts with decreasing θ by about 25 cm^{-1} in good agreement with our data (see Ref. (*1*, Fig. 1)); we have found $\Delta\nu$ = 21–25 cm^{-1} for the peak of approx the same position. Thus, there is no problem with this peak.

(ii) The shape of the broadened peak between 2000 and 1800 cm^{-1} as shown in sequent A indicates that there are at least *two* distinct states of adsorbed CO being monitored here. Actually, the segment B suggests that under better resolution (no island formation upon desorption) there are probably *three* states to be identified. Each of the peaks shifts by about 20 cm^{-1} by variations in θ(CO). This is again the same finding as made by us in Ref. (*1*). Our Figs. 1 and 2 show the presence of two states, each of them shifting with θ(CO) by 28 and 33 cm^{-1}, respectively. There is a small difference in the lowest value of $\nu(\theta \rightarrow 0)$: while our extrapolations (see Ref. (*1*, Fig. 1)) do not reach lower than 1910–1915 cm^{-1}, Bredikhin and Lokhov's lowest value is about 1895 cm^{-1}. However, the authors themselves say that they observed variations in the singletone value of 10–15 cm^{-1} for different supports and Pd particle sizes (our experience is similar, see Ref. (*1*, Fig. 1)), so that the data can be considered as being in agreement, within the possible variations between the various sets of results.

(iii) We were unable to detect a separate peak at 1805 cm^{-1} as the authors do in segment B of their Fig. 1. Our detection system was probably less sensitive. Comparison of the segments A and B of the authors Fig. 1 reveals that the identification of the absorption at 1805 cm^{-1} is not easy. Either it was absent with our catalysts or we have missed it. However, it is incorrect (in our opinion) to ascribe the whole $\Delta\nu$ value 1805–1965 (or even 1805–1910) cm^{-1} to a shift of one single state and then to say that $\Delta\nu$ is the same on powders and single crystal planes. "Singletone value" does not mean "the lowest possible value," as Bredikhin and Lokhov understand it, but it's the lowest possible value of ν *for a given state,* and there are clearly two or three states discernible in the spectra by Bredikhin and Lokhov in the region 1800–2000 cm^{-1}.

REFERENCE

1. Hendrickx, H. A. C. M., Bouvrie, C. des, and Ponec, V., *J. Catal.* 109, 120 (1988).

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