Raman Spectroscopy of Nanocarbon Catalyst for Oxidative Dehydrogenation Reactions

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We use Raman spectroscopy to study nanocarbon catalyst for the oxidative dehydrogenation of ethyl benzene to styrene. The Raman spectra of lava-CNFs catalyst before and after reaction are shown in Fig 1.The band characteristic to carbon and CNTs are observed at 1344 cm^{-1} (D band), 1584 cm^{-1} (G band), 2688 cm^{-1} (2D; overtone of D band), 2928 cm^{-1} (G+D; combination of G and D bands) and 3168 cm^{-1} (2G; overtone of G band). After the catalytic reaction, all the major Raman features of lava-CNFs composite remain (Fig. 1 (c) and (d)). A slight shoulder at 1612 cm^{-1}, known as D' band appeared (inset in Fig. 1). The D' band is typical for disordered carbon. The Raman studies indicate that, besides the slight carbon deposition, the lava-CNFs are stable catalysts for the tested reactions [1].

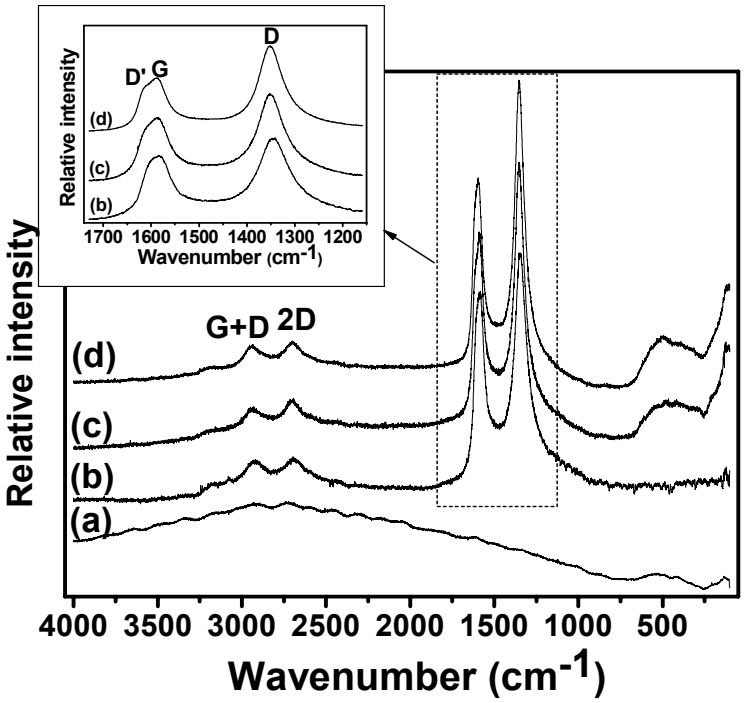

Figure 1: Raman spectra of: (a) lava, (b) lava-CNTs before reaction, (c) lava-CNTs after ODH of ethylbenzene to styrene and (d) lava-CNTs after ODH of utane to butadiene reaction. The inset: Part of the Raman spectra of samples containing CNTs showing D, G and D' bands.

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