Erratum: Symmetry-Dependent Exciton-Phonon Coupling in 2D and Bulk MoS_2 Observed by Resonance Raman Scattering [Phys. Rev. Lett. 114, 136403 (2015)]

Bruno R. Carvalho, Leandro M. Malard, Juliana M. Alves, Cristiano Fantini, and Marcos A. Pimenta

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In our Letter, we have studied the resonance Raman spectra of 2D and bulk MoS_2 using more than 30 different laser excitation lines covering the visible range (1.85–2.81 eV), which allowed us to obtain the Raman excitation profile (REP) of the A_{1g} and E^1_{2g} modes. We have concluded that the A_{1g} mode was enhanced by the A and B excitons, and the E^1_{2g} mode enhanced by the C exciton.

We found recently an experimental artifact in our spectrometer that was depolarizing the scattered light in the range 2.57–2.71 eV, and affecting the intensity of the totally symmetric A_{1g} mode in the Raman spectra recorded with four laser lines (2.57, 2.62, 2.66, and 2.71 eV). We have thus performed new measurements and the results are presented in Fig. 1, where only the spectra related to these four laser energies were replaced. With these new results, we conclude now that the A_{1g} mode is also enhanced by the C exciton, in agreement with previous resonance Raman results for bulk MoS_2 [1,2].

Figure 2 shows the new version of the Raman excitation profile (REP), where we corrected the data in the laser energy range 2.57–2.71 eV. We concluded now that the REP of the C exciton is broader than our previous result. The new values of the energies and damping constants of the C exciton are shown in Figs. 3(a) and 3(b). In Fig. 4, we plot now the intensity ratio of the A_{1g} and E^1_{2g} modes (instead of the ratio E^1_{2g} and A_{1g}) showing that the A_{1g} bands are also enhanced by the C exciton and always stronger than the E^1_{2g} bands.

In summary, with the correct results for the A_{1g} mode in the range 2.57–2.71 eV, we show now that this mode is also enhanced by the C exciton, and that the C exciton REP is broader than the result previously presented.

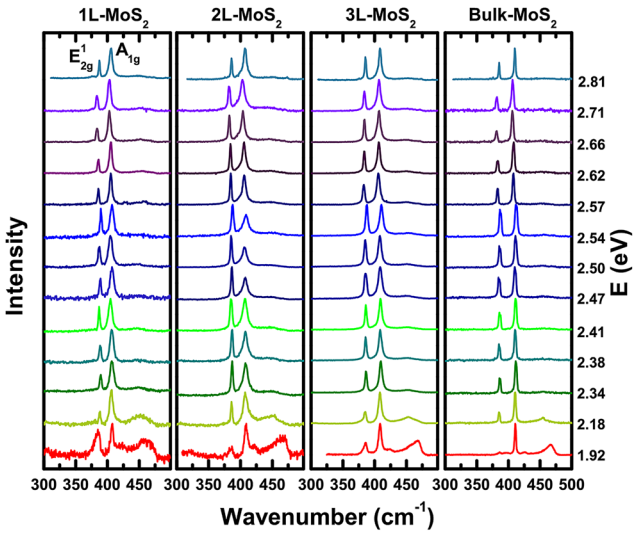

FIG. 1. Raman spectra of MoS_2 samples with different numbers of layers, and recorded with the different laser excitation energies shown in the right side. Panels from left to right correspond, respectively, to 1, 2, and 3 layers, and bulk samples.

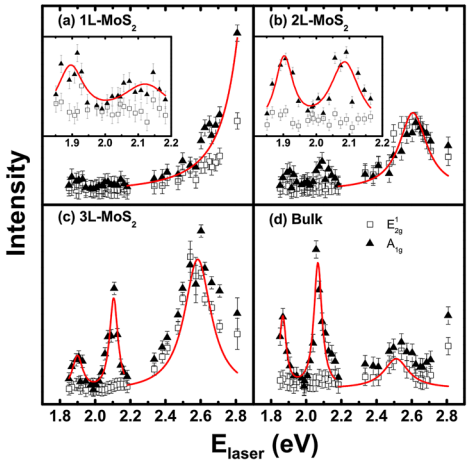

FIG. 2. Raman excitation profiles of the E^1_{2g} (open squares) and A_{1g} (solid triangles) Raman peaks in (a) monolayer, (b) bilayer, (c) trilayer, and (d) bulk MoS_2 samples. The insets show a zoom-in of the data in the range 1.8–2.2 eV. The red curves represent the fitting of the experimental data by the expression given in Eq. (1).

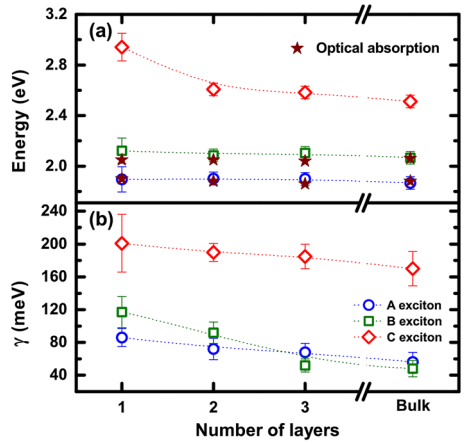

FIG. 3. (a) Energies and (b) damping constants of the A, B, and C excitons for the samples with different numbers of layers.

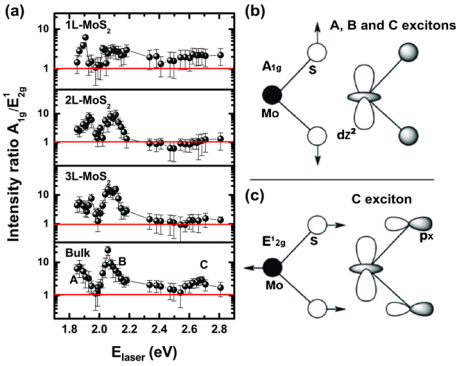

FIG. 4. (a) Ratio of the intensities of the A_{1g} and E^1_{2g} Raman bands, plotted in a logarithmic scale. (b) Atomic displacements of the A_{1g} phonon mode and electronic orbitals of the A and B excitons. (c) Atomic displacements of the E^1_{2g} phonon mode and electronic orbitals of the C exciton.

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