This work aims at calculating the cross sections for vibrational excitation of the oxygen molecules by collisons with electrons. Potential energy curves are obtained with standard quantum chemistry methods and the R-matrix method with good agreement with measurable molecular properties, the cross sections are calculated within the local complex potential approximation. It was shown that the results obtained with different, but seemingly satisfactory settings can vary by a significant degree. Comparison with experimental data then point out the insufficiency of the local complex potential approximation.