We have carried out theoretical calculations to study the dynamics of X+H\(_2\), where X = O\((^1D)\) or C\((^1D)\), reactions and isotopic variants where hydrogen atoms are substituted by deuterium at low temperature by means of a statistical quantum method [1]. Integral cross sections at the low energy regime and rate constants [2, 3] have been obtained and compared with results obtained by means of exact quantum mechanical approaches and phase space theory. In addition to this, recent experimental investigations on these processes constituted a useful benchmark to test both the theoretical predictions and the role played by different electronic potential energy surfaces.

References