

According to the recent literature, it has been demonstrated that the atomistic scale recognition of amino acids and peptide-bonds in polypeptides and proteins is in principle possible by measuring the tunneling current flowing across a narrow nano-gap in graphene nano ribbons during the peptide translocation. In this paper, we concentrate on the tunneling current signal properties measured for nano-gaps of different sizes. Using the non equilibrium Green function method based on the density functional theory, we have studied the tunneling current for larger gap sizes that can be actually realized according to the present state of the art sub- nanometer nano-pore and nano-gap technology. Also in these cases the peptide bond can be still recognized, the obtained signal being well within the measurable range of the current. The signal shapes undergo a change from a double peak feature per peptide bond for narrow gaps to a structured single peak signal per peptide bond for wider gaps. The reason is related to the different orbital overlap range of the two contributions giving rise to the original double peak signal for narrow gaps.