Exercise I: Optical conductivity of a metal

To obtain the optical conductivity of a Aluminum $\sigma(\omega, T)$, we measured its reflectivity (the data are available in the attached file).
1) Draw the reflectivity and comment the its behaviour with energy.
2) From the graph, extract the plasma frequency of Al.
3) Now use Reffit software to fit the reflectivity.
Note: For the fit, use two Lorentzians.
4) With Reffit, calculate the optical conductivity of Al, discuss the behaviour.
5) In the context of Drude model, extract, the scattering rate, the number of the carriers and the effective mass.

Exercise II: Optical conductivity of a doped Mott insulator

We measured the reflectivity of the optimal doped $Bi_2Sr_2CaCu_2O_{8+\delta}$ at two temperatures T=294 K and T=20K, (the data are available in the attached file).
1) Draw the reflectivity at both temperatures and comment the its behaviour with energy and temperature.
2) Use Reffit software to fit the reflectivity of BiSCO.
3) With Reffit, calculate the optical conductivity of BiSCO, and discuss the behaviour.
4) Extract, the scattering rate, the number of the carriers and the effective mass.
5) Make a comparison between a normal metal and a doped Mott insulator.