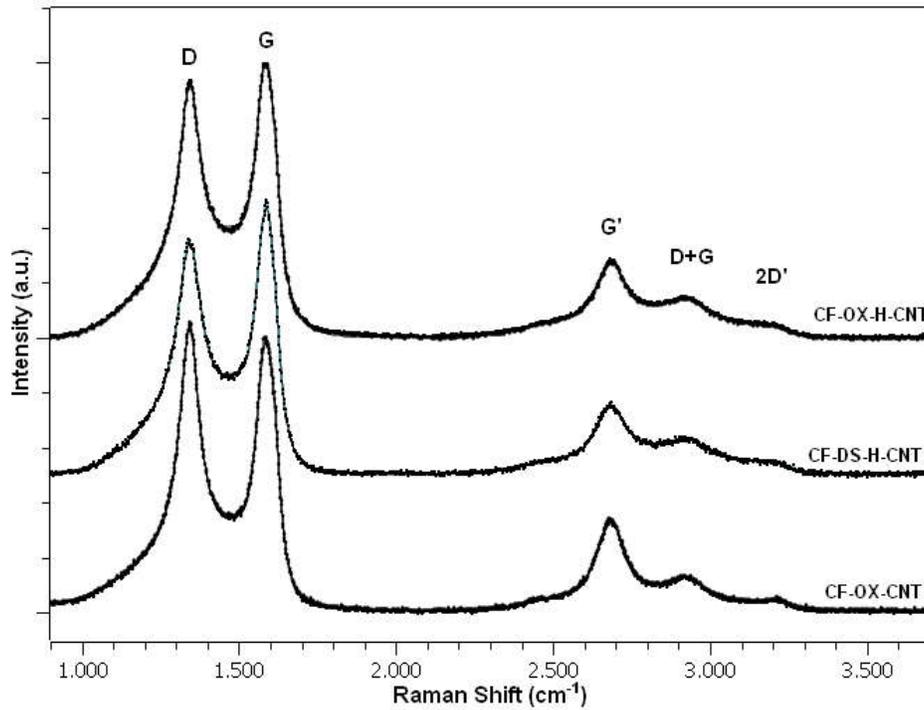
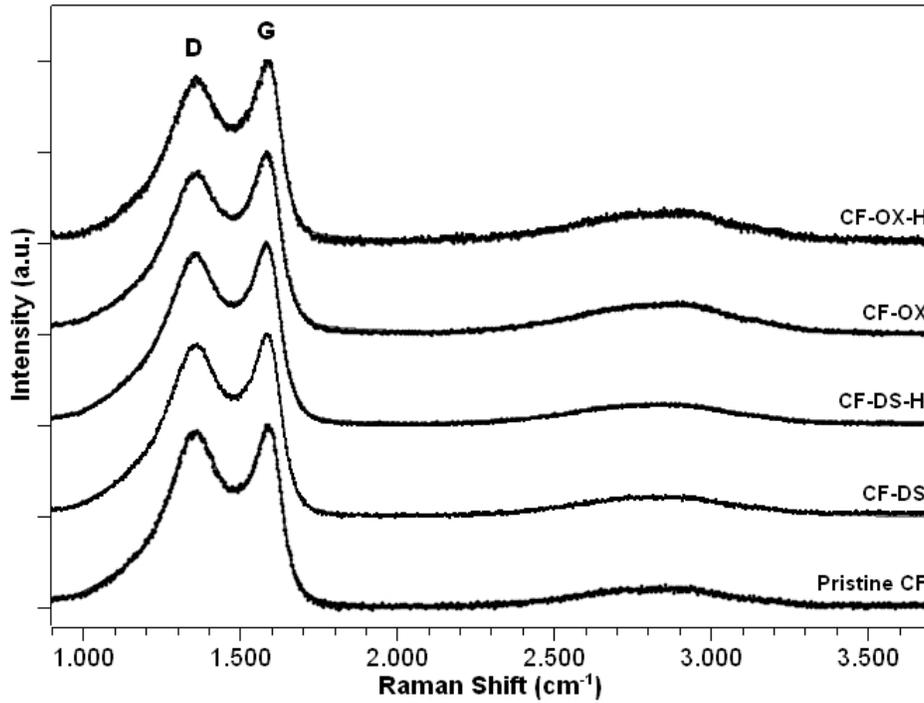


### Supplementary information S4



Top: Raman spectra of carbon fiber after the indicated pretreatments

Bottom: Raman spectra of carbon nanotubes grown on carbon fiber, as indicated