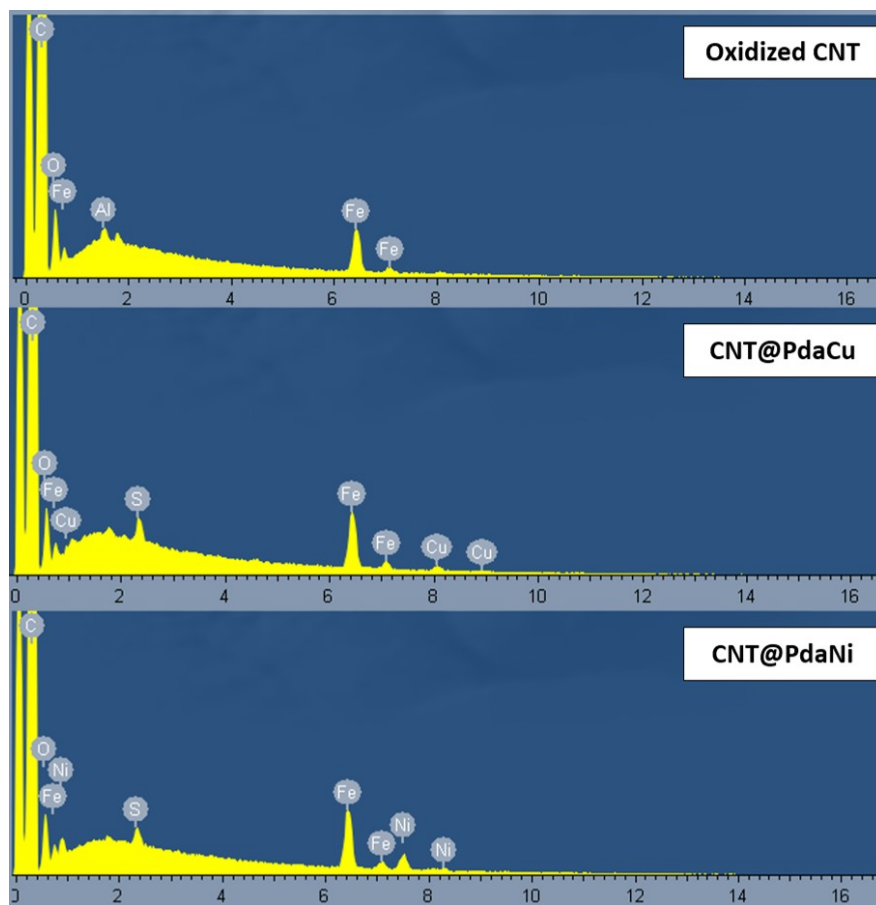
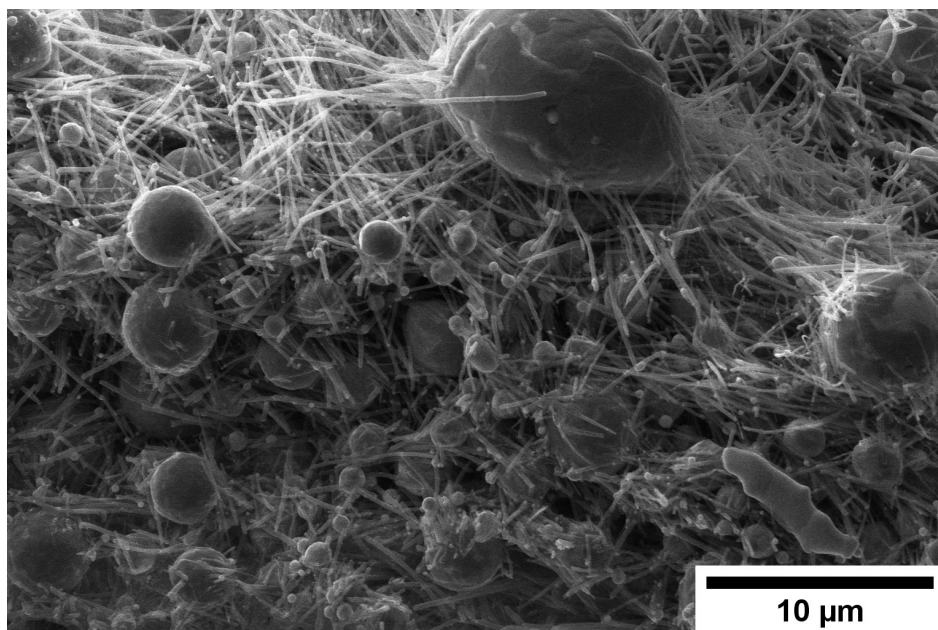


## Supplementary information

EDX spectra (Figure 1) confirm the presence of Cu and Ni in the CNT@PdaCu and CNT@PdaNi carpets, respectively. It was verified that the Al and S detected came from the support used for EDX while Fe (present in all the samples) came from the catalysts used to grow the CNT.



**Figure 1.** EDX spectra of oxidized CNT, CNT@PdaCu, and CNT@PdaNi carpets.



**Figure 2.** Zoom on the Ni-CNT ampacity line failure zone (annealed at 873 K).