Synthesis and Characterization of Nanocomposites Through In-Situ Polymerization of Aniline in the Presence of Calcined Ink Waste

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Abstract:

The work has a double impact, environmental (recovery of industrial waste) and the second part concerns the valorization of the waste by using it as a dispersed phase in the preparation of PANI/CWIP nanocomposites. The first part is dedicated to the calcination of ink waste following by a complete characterization by different techniques. The characterization of CWIP shows the phase transition of the principal constituent from Fe3O4 to Fe2O3. The valorization of the CWIP is done by the dispersion of the calcined ink waste powder in a polymeric matrix, in order to prepare nanocomposites. The characterization of PANI/CWIP nanocomposites shows an improvement in the optical and electrical conductivity properties. The results of the optical characterization show that the PANI/CWIP nanocomposites have a good UV-blocking of 4-order compared to PANI matrix. The optical transmittance decreases with increasing the CWIP rate in the PANI matrix by about 30%. The addition of CWIP nanoparticles to the PANI matrix improves the electrical conductivity of PANI/CWIP nanocomposites. Electrical conductivity increases by 3 times when the concentration of CWIP nanoparticles increases from 3% to 10wt% in PANI matrix.