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Abstract

In this study, two polyester nonwovens PET1 and PET2 were functionalized and designed via grafting of PAMAM(NH_2)$_4$ as dendrimers (Dr) and 3-(aminopropyl)triethoxysilane (APTES) flowed by the incorporation of copper (Cu) and silver (Ag) nanoparticles, with the aims reducing toxic molecules, dissociated particles and bacteria. The obtained nonwovens PET1-Dr and PET2-APTES-Ag/Cu were fully characterized by SEM, FT-IR, XRD, ATG, DCO, optical microscopy and water contact angle. Results elucidated that hydrophilic hydroxyl/amino groups were successfully introduced onto the surface of both PET1-Dr and PET2-APTES-Ag/Cu nonwovens. UV–vis spectroscopy was employed to control the amount of mixture 4-NP and dyes, to compare the degradation of all toxic compounds, individually and mixed. Compared to the original PET nonwoven and several other reported nonwovens, PET2-APTES-Ag/Cu exhibited relatively high catalytic reduction of 4-nitrophenol (4-NP), methylene blue (MB), malachite green (MG) and remazol red (RR). The conversion rates exceed reach 98.2% in 7min and the kinetics of reduction and degradation were compared.