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INFLUENCE OF THE CARBON NANOTUBE ADDITION ON THE STABILITY UNDER 65MEV PROTON IRRADIATION OF PANI-CSA FILMS

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The conductivity of polyaniline (PANI) can be further enhanced by adding carbon nanotubes (CNTs) or recently also graphene sheets [1]. PANI/ CNT composites have a variety of applications in electronics, like for example cathodes for ionic Lithium metal-polymer cells [2]. Often polyaniline is protonated with camphorsulphonic acid (CSA). In this way a high degree of crystallinity is achieved, the mixture has a good solubility and gives the polymer a metallic like behavior. Application of PANI-CSA as microwave-absorbing material [3] and as transparent conductive material for organic light emitting diodes (OLEDs) has been reported [4,5]. For the future use of electronic devices in a space environment, radiation hardness is a major concern. We investigated the stability of PANI-CSA thin films, with and without CNT addition, spin-coated on glass substrates after irradiation with 65MeV protons (fluences up to 2.5.1013 protons/cm2). A strong conductivity enhancement of more than two orders of magnitude for the PANI-CSA films with 4wt% CNTs, when compared to the pure PANI-CSA film, has been found. After irradiation with the highest proton fluence, a conductivity decrease of less than one order of magnitude has been measured for the samples with and without CNT addition. An AFM study gave a detailed picture of the morphology changes by the irradiation.