CC08

Electromagnetic Wave Absorption Properties of Fe-Based P/M Sheets Mixed with Carbon Black or Carbon Nanotube

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Fe_{73}-Si_{16}-B_7-Nb_3-Cu1 (at%) soft magnetic amorphous strip was made via melt spinning, and then the strip was pulverized using an attrition mill to obtain flake-shaped powder. The powder was heat-treated to crystallize an amorphous structure at 540°C for 1h under a nitrogen atmosphere. A little amount of carbon black or CNT (carbon nanotube) was added to the Fe-based powder respectively for the improvement of EM (electromagnetic) wave absorption. The Fe-based powders were mixed with either carbon black or CNT of 0.1~1wt% each by ball milling for 1h. The mixture was tape-cast with a polymer based organic binder, followed by drying at 100°C to make a EM wave absorption sheet. EM wave absorption properties of the sheet were investigated using a network analyzer and a impedance analyzer. As a result, the addition of carbon black or CNT improved the EM- absorbing properties of the sheets. The effect of carbon black and CNT additions to Fe-based sheets on EM wave absorption properties will be compared and discussed in detail through the further work of this study.

CD01

Pharmacokinetics of Radio Isotope Labeled Magnetic Nanobeads

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Abstract

Biocompatible superparamagnetic nanoparticles such as magnetite have been widely utilized as targeting agents for directing the chemotherapeutic drug to a localized disease site. As well, there is utilization of magnetic nanoparticles to guide transport of radionuclides, which have an advantage of high concentrations of radioactivity to the target area.

We have developed an approach to directly label the radioactive Tc-99m with magnetite (Fe_3O_4) nanoparticles for diagnostic applications. Our approach of directly labelling of Tc-99m with ferrite nanoparticles no needs pre-process of chemical modification, yet achieving highly labeling efficiency and keeping bead's size small. As prepared radiolabeled ferrite nanoparticles can be utilized for diagnosis application or further conjugated with chemicals for therapeutic purposes, under magnetic assistance to the target area. For practical therapeutic or diagnostic applications, the knowledge of organ distribution of injected particles is necessary.

This presentation reports the study of the kinetics of *in vivo* bio-distribution of the radiomicrospheres upon injection, and the capability as prepared radiobeads conjugated with pharmaceutical chemicals. In this study, the *in vivo* bio-distribution of these beads, the Tc-99m labeled ferrite nanoparticles were intravenously injected into tail vein of rats. Then, the scintigraphic image were monitored by planar imaging, using a gamma camera. From the scintigraphic images, we have performed analysis on the time evolution of the radio-intensity of heart, lung and liever, respectively. It is observed that the uptake of particles by the organ is very fast and completed within first few minutes after interavenously injection. Modeling with dynamical equation for the fate of radiomicrospheres has been performed. Details will be reported.

Support by NSC Taiwan is acknowledged.