THE LNVENTION RADIATION SHIELDING CONTAINER FROM EPOXY RESIN MIXED WITH BISMUTH FOR TECHNETIUM -99M RADIOPHARMACEUTICALS

การประดิษฐ์อุปกรณ์กำบังรังสีสำหรับบรรจุสารเภสัชรังสีเทคนีเซียม-99 เอ็ม จากอีพ็อกซี เรซินผสมบิสมัทออกไซด์

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Introduction

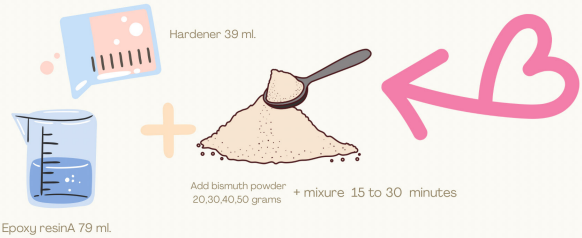
The radiation is widely used in medicine for both diagnosis and treatment. At the same time, radiation can also cause radiation hazards (i.e., hair loss, DNA damage) without a proper radiation shielding. Technetium-99m (^{99m}Tc) radiopharmaceutical is one of the most common types used in nuclear medicine The unsealed source like ^{99m}Tc is continuously emitted radiation, the radiation shielding material should be applied to protect the occupational and public populations. Lead element is the gold standard and commonly used for radiation protection devices. On the other hand, lead has some disadvantages like heavy and toxic.

Purpose

Research purposed was to study an appropriate ratio for inventing a radiation shielding container from Epoxy Resin mixed with Bismuth oxide (Bi_2O_3) ^{99m}Tc radiopharmaceuticals and compare the radiation shielding efficiency of manufactured equipment with lead standard products.

Methods

The sample was prepared by using a mixture of Epoxy Resin A with hardening substance at a ratio of 2:1 and stir for approximately 15 minutes. After that, Bi_2O_3 was added into a epoxy-resin with 0, 20, 30, 40 and 50 grams, then stir the mixture for 15 to 30 minutes. Next step, pout mixing substance into octagonal and cylindrical silicone molds and leave it until the mixture is completely dry. To test the radiation shielding performance of the radiopharmaceuticals, Technetium-99m at activity 5, 10, and 20 mCi were used to simulated the clinical situation. The measurements were performed at 0, 50 and 100 cm with 0, 90, 180 and 270 degrees.



Expected outcome

Revealed that our radiation shielding container was formed completely without brittle. Therefore, the researcher expects that the devices will provide the similary radiation shielding effectiveness to commercial lead radiation shielding devics.

Reference

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Keywords

Radiation shielding, Technetium-99m, Epoxy Resin, Bismuth oxide

The Invention Radiation Shielding Container from Epoxy Resin Mixed with Bismuth for Technetium-99m Radiopharmaceuticals

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Abstract

Currently, the radiation is widely used in medicine for both diagnosis and treatment. At the same time, radiation can also cause radiation hazards (i.e., hair loss, DNA damage) without a proper radiation shielding. Technetium-99m (^{99m}Tc) radiopharmaceutical is one of the most common types used in nuclear medicine The unsealed source like ^{99m}Tc is continuously emitted radiation, the radiation shielding material should be applied to protect the occupational and public populations. Lead element is the gold standard and commonly used for radiation protection devices. On the other hand, lead has some disadvantages like heavy and toxic. Therefore, this research purposed was to study an appropriate ratio for inventing a radiation shielding container from Epoxy Resin mixed with Bismuth oxide (Bi_2O_3) ^{99m}Tc radiopharmaceuticals the sample was prepared by using a mixture of Epoxy Resin A with hardening substance at a ratio of 2:1 and stir for approximately 15 minutes. After that, Bi_2O_3 was added into a epoxy-resin with 0, 20, 30, 40 and 50 grams, then stir the mixture for15 to 30 minutes. Next step, pout mixing substance into octagonal and cylindrical silicone molds and leave it until the mixture is completely dry. To test the radiation shielding performance of the radiopharmaceuticals, Technetium-99m at activity 5, 10, and 20 mCi were used to simulated the clinical situation. The measurements were performed at 0, 50 and 100 cm with 0, 90, 180 and 270 degrees. Resulted revealed that our radiation shielding container was formed completely without brittle. Therefore, the researcher expects that the devices will provide the similary radiation shielding effectiveness to commercial lead radiation shielding devics.

Keywords: Radiation shielding, Technetium-99m, Epoxy resin, Bismuth oxide

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