Mini Review
Volume 13:12, 2022

Journal of
Nuclear Medicine & Radiation Therapy

ISSN: 2155-9619 Open Access

Hybrid Ultra-Low-Radioactive Material for Dark Matter Detector Protection from Background Neutrons

Marina Zykova*

Department of Chemistry and Technology of Crystals, University of Chemical Technology, Moscow, Russia

Abstract

For the sake of public safety and national security, radioactive materials must be regulated. Nuclear facilities, nuclear leaks and terrorist acts involving radioactive materials all have the potential to significantly compromise public and environmental safety. Special containers and careful monitoring are required for the transportation of radioactive waste, spent fuel and radiation sources. As a result, radiation monitoring of radioactive storage in real time enables prompt response in the event of leakage, diversion, or other issues. At the moment, low-power devices that enable long-term monitoring of the radiation state on the surface of radioactive substances are available. Corresponding metal-oxide-semiconductor (CMOS) solid dynamic pixel sensors (MAPSs) offer low power utilization, radiation opposition, high unwavering quality and cost viability; In addition, they show a lot of potential for use in monitoring ionizing radiation.

Keywords: Polymethylmethacrylate • Gadolinium • Uranium

Introduction

Radioactive materials are substances that contain unstable atomic nuclei that undergo radioactive decay, releasing radiation in the process. These materials can be found in a wide range of settings, from nuclear power plants to medical facilities to natural sources in the environment. While some radioactive materials can be safely handled and used for various applications, others pose significant health risks and require careful handling and disposal [1].

In interventional radiology, MAPS-based ionizing radiation detection has been extensively utilized for charged particle track detection and individual dose monitoring of doctors and patients in recent years. Additionally, the possibility of using this optical device to detect nuclear radiation has received a lot of attention. The Istituto Nazionale di Fisica Nucleare (INFN) developed a wireless transmission active real-time pixel dosimeter for interventional radiology to monitor doctors' individual doses based on MAPS's response to X-rays. CMOS radiation detection and ZigBee wireless transmission technology were combined to create a remote measurement device for low-energy radiation detection. In addition, MAPSs are sensitive to neutrons and the energy of the neutron and the volume of the injection determine their response signals [2].

Literature Review

The types of radiation emitted by radioactive materials include alpha, beta and gamma radiation. Alpha radiation consists of high-energy helium nuclei, beta radiation consists of high-speed electrons or positrons and gamma radiation consists of high-energy photons. Each type of radiation has different properties and interacts with matter in different ways. For example, alpha radiation can be stopped by a piece of paper or the outer layer of skin, while gamma radiation can penetrate much deeper into the body.Radioactive materials are used in a variety of applications, including medical imaging and therapy, nuclear power generation and scientific research. In medical imaging, radioactive materials can be injected into the body and then detected using specialized equipment, allowing doctors to diagnose and treat a variety of conditions. Radioactive materials are also used in cancer treatment, where they can be targeted specifically at cancer cells to destroy them while leaving healthy cells intact. In nuclear power generation, radioactive materials are used to produce heat, which is then used to generate electricity. However, the handling and disposal of radioactive materials in nuclear power plants is a significant concern due to the potential for accidents and leaks. When radioactive materials are released into the environment, they can contaminate soil, water and air, posing a risk to human health and the environment [3].

Discussion

Radioactive materials also occur naturally in the environment, such as in rocks and soil and can be released into the environment through natural processes such as erosion or volcanic activity. In some areas, the natural presence of radioactive materials can pose a health risk, particularly if people are exposed to high levels over a prolonged period. One of the key challenges associated with radioactive materials is their safe handling and disposal. When radioactive materials are no longer needed or have reached the end of their useful life, they must be carefully disposed of to minimize the risk of exposure to humans and the environment. This can involve storing radioactive materials in specialized facilities, such as nuclear waste repositories, or treating them to reduce their radioactivity before disposal [4].

The safe handling and disposal of radioactive materials is a complex process that requires specialized expertise and equipment. Those working with radioactive materials must undergo rigorous training and follow strict safety protocols to minimize the risk of exposure. Additionally, regulations and guidelines are in place at the local, state and federal levels to ensure that radioactive materials are handled and disposed of safely. While the risks associated with radioactive materials cannot be completely eliminated, they can be minimized through careful handling, storage and disposal. The use of radioactive materials in medical imaging and therapy has greatly improved the diagnosis and treatment of a variety of conditions, while the use of nuclear power has the potential to provide a reliable and low-carbon source of energy. However, it is essential that these materials are used and disposed of safely to prevent harm to human health and the environment [5].

***Address for Correspondence:** Marina Zykova, Department of Chemistry and Technology of Crystals, University of Chemical Technology, Moscow, Russia; E-mail: zykova.marina6@inbox.ru*

Received: 01 December, 2022, Manuscript No. jnmrt-23-90739; **Editor Assigned:** 03 December, 2022, PreQC No. P-90739; **Reviewed:** 15 December, 2022, QC No. Q-90739; **Revised:** 20 December, 2022, Manuscript No. R-90739; **Published:** 27 December, 2022, DOI: 10.37421/2155-9619.2022.13.520

Conclusion

Radioactive materials are substances that contain unstable atomic nuclei that release radiation as they decay. These materials are used in a variety of applications, including medical imaging and therapy, nuclear power generation and scientific research. However, the handling and disposal of radioactive materials must be carefully managed to minimize the risk of exposure to humans and the environment. While the risks associated with radioactive materials cannot be completely eliminated, they can be minimized through proper training, safety protocols and regulatory oversight.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Zykova, Marina, Mikhail Grishechkin, Andrew Khomyakov and Elena Mozhevitina, et al. "Hybrid ultra-low-radioactive material for protecting dark matter detector from background neutrons." *Mater* 14 (2021): 3757.
2. Wurm, Michael, John F. Beacom, Leonid B. Bezrukov and Daniel Bick, et al. "The next-generation liquid-scintillator neutrino observatory LENA." *Astropart Phys* 35 (2012): 685-732.
3. Zhang, Shao-Jun, Yuan-Yuan Liu, Sha-Sha Lv and Jian-Ping Cheng, et al. "Surface metallization of PTFE and PTFE composites by ion implantation for low-background electronic substrates in rare-event detection experiments." *Nucl Sci Tech* 33 (2022): 90.
4. Augier, Corinne, Serge Jullian, Dominique Lalanne and Laurent Simard, et al. "Proposal for an R&D program for a double beta decay experiment sensitive to a 50 meV neutrino effective mass." (2005).
5. Papaioannou, Polydefkis, Mona Sütel, Katrin Hüsker and Wolf-Dieter Müller, et al. "A New Setup for Simulating the Corrosion Behavior of Orthodontic Wires." *Mater* 14 (2021): 3758.

How to cite this article: Zykova, Marina. "Hybrid Ultra-Low-Radioactive Material for Dark Matter Detector Protection from Background Neutrons." J Nucl Med Radiat Ther 13 (2022): 520.