

Patent :Natural x-ray absorbent material

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Abstract :

X-rays can alter our DNA, which could ultimately result in cancer in later life. This is why the World Health Organization (WHO) and the US government both list X-rays as a carcinogen Trusted Source. However, the advantages of adopting X-ray technology exceed any possible drawbacks by a wide margin.

With this solution, X-ray rooms will use not only utilize lighter-weight materials, but also will have less harmful impact on the environment, while still receiving adequate protection. I have studied a natural compound that attenuates x-rays. The study concluded that the material is characterized by its flexibility and ease of formation with the effectiveness of radiation shielding. The absorbent substance is called Lycopene.

Lycopene is the red pigment present in tomatoes, melons, red fruits and vegetables, I extracted lycopene from tomatoes and conducted laboratory tests and it has proven highly effective, when it comes to the ability to absorb radiation (secondary radiation)—After that, I mixed the material with paint using a unique strategy to ensure that the properties of the material were not lost. The coating has proven to absorb 95% of radiation.

Details :

Electromagnetic radiation that can cause ionization, such as gamma rays and X-rays are dangerous to human health. People can be exposed to gamma rays and x-rays from different types of sources that are used in industries, medical diagnostic centers, nuclear research institutions, nuclear reactors and research involving radioisotope and nuclear weapons development facilities. In order to protect personnel and sensitive electronic equipment from this ionizing radiation, shielding is necessary. Radiation shielding is the practice of protecting people and the environment from the harmful effects of ionizing radiation. Radiation exposure is one of the main concerns when establishing medical X-ray diagnostic rooms, in order to prevent the radiation from causing major health problems among the users of these radiation based facilities. Therefore, many types of shielding materials are installed in the work using radiation sources and x-ray sources, to make the workplace a safe area for humans.

Metal lead (Pb) is been used most often as a radiation shielding material to its high atomic number (Z), high density, low cost, and ease of processing, mainly due to, it provides effective protection against penetrating gamma rays. However, Pb is known for its toxicity and environmental pollution . there are global trends to reduce the use of lead in products between lead shielding. It has now become a priority to try to find materials that can effectively replace lead as radiation shielding materials. Also, The use of polymeric compounds with different compositions as EM is an interference shielding material of contemporary research interest.

Materials & Methods :

To manufacture a protective X-ray protective material, environmentally friendly and effective, with recognized X-ray protection capabilities. The absorbent substance is lycopene, Lycopene C₄₀H₅₆ is a red carotene found in tomatoes, melons, and red fruits and vegetables, such as red carrots, red peppers and papaya. The prepared samples have good attenuation for gamma rays and x-rays, and this efficiency changes relatively according to the percentage of lycopene added, which indicates the positive effect of the prepared materials in the radiation shielding process.

Results :

The coating has proven to absorb 95% of radiation. The properties of the coating are very unique, and the coating is can be used in hospital x-ray rooms. As for the secondary advantages of the coating, it is heat-insulating by 95% and waterproof by 100% and prevents moisture and the formation of mold. On top of its superior mechanical properties, it is also cheaper than the current lead shielding methods used in most hospitals around the world. As for the shelf life of 12 months in a cool and dry place, the product should not be exposed to the sun.

1g of paint = 4g of lycopene

1 kilogram of absorbent paint = 317.5 \$US

1 meter of armor lead = 450.27 \$US

To obtain the best result, 1 layers of 9cm thickness are applied. Which consumes 7 -9 kg per 1 meter.

