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ANTI X-RAY GEOPOLYMER COMPOSITE MATERIAL

Patent No.: US-8337612-B2



PROBLEM STATEMENT

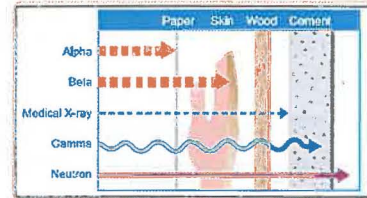
- It is well known that X-rays give bad effects to humans and can cause cancer. Thus, the use of anti x ray geopolymer composite material will help reducing the effects of X-ray penetration to individuals nearby.
- This research is using natural filler from waste such as fly ash, river stone, rice husk and others.
- The properties such as mechanical and physical are comparable with normal cement board/panel. The importance part, this panel function as X-ray shielding.
- This product are using as building material, applied as a wall in X-ray room where it can absorb X-rays in a of geopolymer materials system.

(Health effects of instantaneous exposure to large doses of radiation)

Partial exposure (mSv)	3,000	5,000	7,500	10,000	15,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000	100,000
Exposure of the lens of the eye	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the skin	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the hand	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the foot	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the chest	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the abdomen	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the back	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the neck	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Exposure of the head	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500

PRODUCT PERFORMANCE

PROPERTIES	X – ray Radiation Shielding Geopolymer Material
Compressive Strength	Up to 120 MPa
Water Absorption	less than 5%
Density	2.5 g/cm ³
Radiation Shielding	CS ¹³⁷ = 0.432 μ(cm ⁻¹) CO ⁶⁰ = 0.285 μ(cm ⁻¹)
Chemical Resistance	Sulphuric acid resistant stabilized without further mass change



PRODUCT DESCRIPTION

- The invention is produced using fly ash (waste from the power station) and then activated by chemicals using geopolymer technology available.
- This invention using geopolymer technology with heavy metal or natural filler with high density properties for shielding uses.
- This composite function as X-Ray shielding to protect the human around. The manufacturing technology are green and environmental friendly.
- This invention was designed from natural filler in fly ash based geopolymer composite as a board or panel.

NOVELTIES

- The invention is convenient to use and easy to install.
- Can produce anti x – ray product with various type of geopolymer material.
- Environmental friendly.
- Versatile – Can produce various type of product e.g. door, panel, brick, etc.
- Towards green building.
- Using geopolymer materials that are waste materials, easily available and cheap.
- Simple method of preparation and process.

MANUFACTURING PROCESS



COMMERCIAL POTENTIAL

This invention is suitable for the use in all kind of radiation exposed places. No competition directly or indirectly by the local company. No such organization has provided any product in term of geopolymer material. Therefore market penetration will be easy. Most of competitors are using different kind of material and process available in the market as X-ray shielding protection. Potential customers can be from all kind of industry such as medical, educational, factory, or construction. Can be used widely in Malaysia and internationally and has large geographic view of market opportunity.

APPLICATIONS

- Producing X – Ray Diffraction Geopolymer Panel.
- Producing X – Ray Diffraction Geopolymer Wall.
- Producing X – Ray Diffraction Geopolymer Door.



X-ray Shielding Geopolymer Panel



X-ray Shielding Geopolymer Block



COLLABORATION

This research has collaboration between Universiti Malaysia Perlis (UniMAP) and Mosoul University, Iraq.

PUBLICATIONS

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