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Investigation of Novel Composite Material Based on Extra-Heavy Concrete and Basalt Fiber for Gamma Radiation Protection Properties

The paper presents a new composite material for radiation protection based on extra-heavy concrete reinforced by basalt fiber. Basalt fiber is a new material for concrete reinforcement, which provides improved mechanical characteristics of concrete, reduces the level of microcracks and increases the durability of concrete. Within the scope of present work, the gamma-ray radiation protection properties of concrete reinforced with basalt fiber was modeled. Two types of extra-heavy concrete were used for this paper. The main gamma-ray attenuation coefficients such as mean atomic number, mean atomic mass, mean electron density, effective atomic number, effective electron density, Murty effective atomic number were analyzed with help of WinXCom software. It has been shown that the addition of basalt fiber to concrete does not impair its gamma-ray radiation shielding properties. With increasing the basalt fiber dosage in concrete, the radiation properties against gamma radiation are improved.

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