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Study the effect of addition Rockwool fibers on the Shielding Radiation for the X-ray of Low Density Polyethylene (LDPE)

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Abstract: The extinction of X-rays (radiation attenuation) was studied using the low-density samples of polyethylene polymer to which the rockwool fibers powder is added as filled filler. This latter was blended with (weight percent) and with a micro-filler (filler particle) the sizes equal to or less than<212 μm. Furthermore, the free path average and linear attenuation coefficient were calculated. Experimental results showed that the rockwool fibers powder act to reduce the spaces between polymer chains particularly when the weight percent is more than (10%), which implies the capability of the polymer/filler to make, the X-rays applied to the samples; disappear at these rates used in this study. The experimental work was conducted by applying a radiation beam having an energy of 30 kV based on the use of the X-ray unit with two tubes which are; X-ray generating tube and G-M detector with an energy of $V_{G.M}$ =600. The magnitudes of the mean free path are inversely proportional to the weight percent of the compound material whereas the proportionality of these percentages which are particularly the high ones which occur at experimental values of the linear attenuation coefficient. The value of the mean free path of 1.28 cm is the maximum value obtained at a weight percent of 1 %, whereas the minimum value of the mean path was 0.877 cm at a weight percent of 10 %. In addition, the maximum value of the attenuation coefficient obtained is 4.754 cm^{-1} at a weight percent of 10% and its minimum value at a weight percent of 1% was 0.7 cm^{-1}. The maximum value of transmittance and the minimum value of absorbance were obtained at a weight percent of 10%, are (31.8) and (68.2) respectively. Through the practical results that we obtained that are better suited to high percentages more additive proportions can be used than the percentages used in this research to shielding X-rays more.

Keywords: Rockwool fibers, Low Density Polyethylene, Shielding radiation.

دراسة تأثير إضافة ألياف الصوف الصخري على الحجب الإشعاعي للأشعة السينية للبولي اثيلين واطئ الكثافة

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