1- عنوان البحث

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Investigation of a Modified Cobalt-Free Alloy for Nuclear Application
دراسة سبيكة معدلة خالية من الكوبالت للتطبيقات النووية

2- البيانات الخاصة بالنشر

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4- ملخص البحث باللغة الإنجليزية

Maraging steel represents a special class of high strength steels that differ from conventional steels in that they are hardened by a metallurgical reaction that doesn't involve carbon. The standard maraging steel contains "18% Nickel, 8% Cobalt, 5% Molybdenum and 0.4% Titanium", but Nickel, Cobalt and Molybdenum are expensive elements, this keeps the steels rather expensive, preventing wider selection and application. In the context of a previous work (publication No.4), a new Cobalt-free maraging steel alloy was developed by replacing Cobalt with Chromium and Titanium. In this work, a new steel alloy whose the following composition, "0.045%C-12.73%Ni-6.53%Cr-3.2%Mo-0.02%Ti-0.01%V", was developed. This steel alloy was subjected to gamma radiation shielding tests, where the linear attenuation coefficient, the half-value layer thickness, and effective atomic number of this alloy were measured in the photon energy range 235 -2700 keV. It was shown that the linear attenuation coefficient is inversely proportional to the photon energy from 200 to 1100 keV, then it smoothly decreases with a

less rate than in the low energy region. It was also found that the effective atomic number decreases with energy increase from (0.2 to 1.0 MeV), and then it slightly increases for higher energies. Moreover, these measured values were then compared with the corresponding theoretically calculated by using WinXcom software, and a fair agreement is achieved.