Ferrite magnets belong to the oxide ceramics material group. They pose virtually no health risk. The barium content of some magnets should be noted. Under some conditions, for example with acids, traces of barium can become dissolved. Since barium is a heavy metal, it is preferable for some applications to use strontium ferrite magnets instead.

The toxicity of **rare earth metals** and their **compounds** is not well understood. They were long considered completely harmless, and some have even been used therapeutically for medical purposes. In mechanical processing, it has been recognised that breathing the magnetic dust, especially together with cobalt, is a hazard. Breathing the soluble salts in air-borne dust results in a small elevation of blood levels. Resorption of traces by ingestion is, by contrast, considered harmless. There are no limits for cobalt in the drinking water ordinances. Investigations showed that SmCo magnets have good chemical resistance in neutral and alkaline media. Of course, these metal compounds have no acid resistance. Natural samarium, a main component of SmCo magnets, has about 15% abundance of the isotope ^{147}Sm. Despite this, external contact is completely harmless. The constituents of NdFeB magnets are not hazardous. Nonetheless, one should avoid intake of dust and dissolved material.

Radiation effects on permanent magnets*

Exposure of permanent magnets to radiation can cause structural defects. Structure-dependent properties such as coercivity, induction, and remanence are directly affected, and intrinsic properties such as saturation magnetisation and curie temperature are indirectly affected. Detectable magnetic changes are seen only above a threshold irradiation level that varies between materials. Currently no reliable irradiation level limits have been established. However, deterioration or change has been observed in a small number of experiments at high irradiation levels. For example, irradiation by $5.4 \cdot 10^{18}$ thermal neutrons per square centimetre and $1.2 \cdot 10^{17}$ fast neutrons per square centimetre at 50°C resulted in a 3% decrease in the saturation magnetisation of Fe_2O_3, the essential material in hard ferrites. NdFeB magnets lose more than 50% of their magnetisation at a proton dose of $4 \cdot 10^6$ rad and practically all of their magnetisation at $4.5 \cdot 10^7$ rad. SmCo magnets begin to exhibit significant demagnetisation at higher doses, around 10^9 to 10^{10} rad. Sm_2Co_{17} is less sensitive than $SmCo_5$.

* Source : Concise Encyclopedia of Magnetic and Superconducting Materials, J. Evetts (edt.), pp. 451 ss., Pergamon Press, Oxford, New York, Seoul, Tokyo (1992).