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Change in Iron with Ultraviolet Rays and Water

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I have been examining the influence that ultraviolet rays and water exert on the rock etc. in junior high school science club since 2002. This time, it aimed to irradiate ultraviolet rays to the iron plate soaked in the
distilled water and to examine the change. I think that it is necessary to examine changing pure iron first of all to know how iron in the rock and mineral changes with ultraviolet rays and water.

In this research, The iron plate is put in the test tube filled with distilled water. And ultraviolet rays c is irradiated to the test tube. The peak of ultraviolet rays c is 254 nm. The iron plate is a size of 0.3mm thick 3cm length 1cm wide and the iron purity is 99% or more.

It experimented when ultraviolet rays c was not irradiated as a control experiment on the same condition. Ultraviolet rays c was irradiated for five months. The mean illuminance of ultraviolet rays c is 20w/m2.

As a result of this experiment, a lot of reddish brown powders are generated in the test tube that irradiate ultraviolet rays. From the result of the x-ray diffraction analysis the powder is goethite and magnetite. In the test tube that did not irradiate ultraviolet rays puce powders are generated. From the result of the x-ray diffraction analysis the powder is goethite only.

Moreover, it has been understood that in case of irradiation of ultraviolet rays, the amount of iron oxide is much larger than that of no irradiation of ultraviolet rays.

It is presumed that water existed in the past in Mars surface.

I think that there is a possibility that the magnetite is generated by ultraviolet rays and water on Mars surface.

Keywords: Ultraviolet C, water, Iron oxide, Goethite, Magnetite, Mars