The Effect of a Magnetic Field on the Solubility of Various Compounds

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The goal of the experiment was to determine the effect of a magnetic field on the solubility of slightly soluble chemicals. This information could aid in water treatment, scale removal, construction, and medicine. The hypothesis was that if various aqueous solutions are exposed to a magnetic field, then each chemical will lose some solubility, and calcium carbonate will lose the most solubility. To conduct the experiment, saturated aqueous solutions of calcium sulfate, calcium carbonate, copper (II) carbonate, zinc carbonate, magnesium carbonate, and lithium phosphate were made such that there were no suspended or colloidal solids. Each solution was placed between two permanent 13,200 gauss magnets. The conductivity of the magnetized solutions was compared to the conductivity of the untreated solutions in order to calculate a change in solubility. In calcium sulfate, lithium phosphate, copper (II) carbonate, zinc carbonate, magnesium carbonate, and calcium carbonate, there was no statistically significant difference between the conductivity of the magnetized and unmagnetized solutions, showing that there was no detectable change in solubility. Since there was no change in the solubility of the chemicals, it was concluded that only stronger magnetic fields induce significant changes in solubility, as the literature proves that nuclear magnetic spectrometers can do. Thus, even very strong permanent magnets are not suitable for applications in which water is static. Further research using more powerful magnets, more precise conductivity meters, and circulating the solutions is necessary in order to determine the effect of magnetic fields on solubility.