Hydrothermal Synthesis and Treatment of Jadeite

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Purpose: Nowadays, there is no environmental-friendly method of jadeite treatment, also this mineral is rather rare, so the purpose of this work is to consider the possibility of jadeite synthesis and treatment in medium-temperature hydrothermal conditions. Procedure: Experiments were conducted at 450-500ºC and 700 atm with the use of special hydrothermal equipment – autoclaves and a special oven. Data: Several experiments were conducted in various silicate systems, but jadeite was not obtained at these conditions, so I decided that this mineral is formed at higher temperature and pressure. It is known from the literature that germanium can replace silicon and form silicate analogs at lower PT conditions. Germanium and silicon experiments were successful: we obtained jadeite isostructural analog. In treatment experiments, jadeite samples were kept in different salt solutions in autoclaves. The first sample acquired a deep green color under the influence of chromium oxide, the second became yellow in a sodium chloride solution, and the third bleached in a sodium carbonate solution. Conclusion: As a result, I created a silico-germanium analog of jadeite that confirms the high PT conditions of its formation process. Also, I developed a new coloring and treatment method that is cheap and environmentally friendly.