Morphology of Tourmaline in the Mashhad granites (g2) with using fractal analysis and Diffusion-Limited Aggregation

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Abstract: Based on field observations, tourmalines in Mashhad leucogranites are divided into nodules and dendritic. Fractal geometry is a tool for measuring of irregular shapes. Based on the square method, that is one of the tools of fractal geometry; between fractal dimension and irregular shapes is a direct relationship. Therefore, objects with further irregularities have larger fractal dimension. Tourmaline nodules (dravite) and dendrites (schorl) are the result of late stages of magmatic activity. The difference in the growth rate, surface tension and latent heat of crystallization that would eventually be irregularities are major factors the establishment of various shapes of tourmaline in the study area. Rapid cooling of tourmaline crystals in the late stages of magma crystallization causes a heterogeneous surface with different surface tension. Crystals in the areas with low surface tension are finer and more and this due to high latent heat of crystallization, disorder and fractal characteristics more such as dendritic forms. In the nodules form, accumulation of volatiles escape into the cavities causes the difference in pressure between inside and outside of the cavity. High pressure of outside of cavity than it's inside move nutrients from the margins to center of cavity. Crystallization in center of cavity causes to raise the latent heat of crystallization in center, temperature gradient difference, convection and crystallization of tourmaline nodules'd with greater disorder in the cavity.

Keywords: fractal, surface tension, latent heat, irregularity, dendritic and nodular tourmaline, Mashhad granite

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