

Texture of "Pele's hair": analogy of cotton candy formation

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One will find glass fibers called "Pele's hair" in the volcanic products in Hawaii Islands. It is named after Pele, who is the Hawaiian goddess of volcanos. The texture of the glass fibers (thickness and length of fibers) depends on rheological properties, cooling rate, ejection speed, wind velocity, and so on. In order to understand the formation process of "Pele's hair", we investigated the dynamics of cotton candy formation. The experimental equipment consists of a rotating dish, a heater, and measurement system of temperature and rotation velocity. The rotating dish is made of thin steel, and has small outlets along its periphery. To make threads of cotton candy, the crystal sugar is added to the dish, and rotated at a constant speed. The melted sugar is formed after heating the rotating disk, and is ejected through the outlets. We varied experimental parameters: the rotating speed, heating temperature, diameter of the outlets, which cause a variation in the texture of the cotton candy. We will demonstrate how those parameters affect the thickness of the ejected cotton candy threads and discuss the formation process of "Pele's hair".

Keywords: Volcano, Experiment, viscous fluid