The Comparison of Natural and Synthetic Gemstone Formation and Composition

Ce'Nedra L. Dillard

Quantitative Methods in Rocks and Minerals

Steve Teeter and Christian Brundin

Summer Ventures in Science and Mathematics

The University of North Carolina at Charlotte

In this paper, natural and synthetic gemstones will be compared, focusing on three of the world's most important gemstones: rubies, sapphires and emeralds. Rubies and sapphires are both varieties of corundum, but contain different types of colorants. Rubies and emeralds are varieties of different minerals, but have the same colorant and are different colors. The colors of gems are determined depending on what colors the colorant's atoms absorb. The origins of gemstones and the three gems and a study of their visual characteristics, chemical composition, and where and how they form are discussed. The focus will primarily be on emeralds. Hiddenite emeralds, in Hiddenite, North Carolina, are studied because as they are the only emeralds found in North America. This paper mainly analyze the process of creating synthetic gemstones, which began to develop in the mid-1800's when Frenchmen Gauden was the first to attempt and succeed in obtaining the crystals of ruby synthetically. The origins and the development of the process of making synthetic gems show how science and technology has developed over periods of time to give a real world perspective. One of the very first inventions built in the late 1800's to accommodate creating, the Vermeil Furnace, is even still used today. The comparisons between natural and synthetic show how man can use scientific knowledge to create a man-made object so similar to something that occurred naturally in mother nature that sometimes the two objects cannot be told apart.