

## عنوان مقاله:

Gamma-ray effect on natural quartz gem crystals' quality from Qazvin and Astane regions, Iran

## محل انتشار:

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## خلاصه مقاله:

In this study, irradiation treatment was examined on colorless and clear quartz crystals collected from east of Qazvin (EQ) and southwest of Astane (SWA) regions in Iran. EQ crystals up to ۳ cm were found in the geodes in andesite and trachyandesite, while idiomorphic crystals up to ۲ cm from SWA formed in cavities and vugs in rhyodacitic host rocks. Crystals of both locations were exposed to gamma rays under the same conditions in steps of ۱۰۰ kGy, ۲۰۰ kGy and ۳۰۰ kGy. No specific color change was observed for EQ crystals, while colorless SWA samples completely turned into dark gray or smoky gray from ۱۰۰ kGy onwards. Comparing chemical analysis (ICP\_MS) of samples revealed that SWA crystals contain more impurities with significantly higher Al. Representative Al contents in EQ and SWA samples are ۳۲۲ ppm and ۳۳۷۸ ppm respectively. Data from Raman and infrared spectroscopy structural analyses, show similarities between studied samples from both regions. Formation of smoky quartz after radiation is related to color center defects. Field evidence reveal the direct effect of hydrothermal fluids and vapors related to Astane granitic intrusions on country rocks in the aureole, in forming colorless quartz crystals with high concentrations of aluminum impurities substituting Si.

## کلمات کلیدی:

Quartz crystals, Irradiation treatment, Gamma ray, Smoky quartz, Color center

## لینک ثابت مقاله در پایگاه سیویلیکا:

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