

## **Spectroscopic studies of ruby and pink sapphire samples**

X-ray fluorescent spectrometry, Fourier-transform infrared (FT-IR) and UV-vis spectroscopies are advanced techniques that can be used to characterize gem materials. Transition metal defects are causes of colors in corundum. Fe and Ti are the causes of the blue color in blue sapphire while Cr is the cause of the colors in ruby and pink sapphire. In this work, we investigated the differentiation between ruby and pink sapphire samples. The amount of Cr, Ti, Fe and V were analyzed by x-ray fluorescent spectrometry. The concentrations of the defects were calibrated using NIST 610 standard reference material (SRM) and laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). The vibrational and optical characteristics were analyzed by the FT-IR and UV-vis spectroscopic techniques respectively.

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**Track Classification:** Material Physics, Nanoscale Physics and Nanotechnology