

Perspective for gem identification techniques in the next decade

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The use of new or newly adapted technologies brings bright perspectives for the future of gem identification. Classical gemmology combined with careful observation, however, should remain the most effective basic technique. Currently, laboratory methods such as absorption spectroscopy (visible, infrared), X-ray fluorescence and Raman scattering have helped solve most of the newer challenges. Gem-specific instruments are developed for diamond and its imitations. Luminescence techniques, sensitive to very small concentrations of defects or impurities, are progressively taking more importance.

Future trends are towards methods that will provide more detail, either chemical or structural, useful to separate natural from treated or synthetic gems.

- Imaging and mapping techniques will likely have a significant impact in the next few years. The development of high-resolution digital cameras and detectors will bring a bonanza of new information, for example in luminescence and X-ray fluorescence.

- Inductively coupled plasma mass spectroscopy, with laser ablation, is a chemical analysis technique which can potentially allow to go to or below the ppm level for the detection of impurities in gems, in a virtually non-destructive manner.

- If isotopic distinctions become helpful then the ion probe might have some limited use.