LEADING WITH INNOVATION.

APPLICATION NOTE

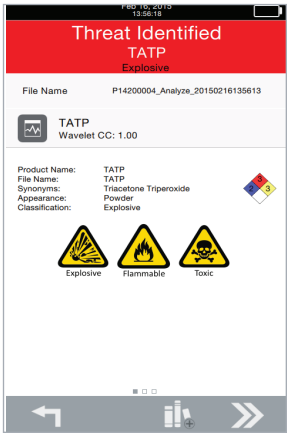
DETECTION OF HOMEMADE EXPLOSIVES USING HANDHELD RAMAN

- Identify explosives in the field
- Measure precursors without interference
- Rapidly distinguish from non-explosive materials

As commercial explosives become more difficult to obtain, terrorists turn to producing homemade explosives (HMEs). HMEs are typically produced in makeshift labs using materials that can be easily obtained by the public. Because HMEs are synthesized under improvised conditions, the product typically contains impurities, many of which color the sample and produce fluorescence so they cannot be analyzed using previous generation 785nm Raman-based systems. Handheld Raman using 1064nm excitation reduces fluorescence interference and allows for many of these HMEs to be easily identified in the field with little or no sample preparation.

CHEMICAL DETECTION IN THE FIELD

A variety of homemade and commercially available explosives were measured with a handheld Rigaku Progeny™ ResQ™ 1064nm analyzer. The 1064nm handheld Raman has the ability to obtain quality spectra and distinguish the explosive materials and their precursors from other materials.



Screenshot of TATP results using a Progeny ResQ handheld analyzer.

MINIMIZE SAMPLE INTERFERENCE WHILE MAXIMIZING EFFICIENCY

A feature found in the most common HMEs is color, due to impurities that are present in the sample, which cause fluorescence interference when using a Raman analyzer with 785nm excitation. The Progeny ResQ handheld analyzer uses a 1064nm longer excitation wavelength laser, and is able to measure a wider range of materials. Figures 1-3 demonstrate the comparison of spectra obtained using a 785nm handheld Raman analyzer to the 1064nm of Progeny ResQ. Progeny ResQ has the ability to measure the colored HMEs without fluorescence intereference.

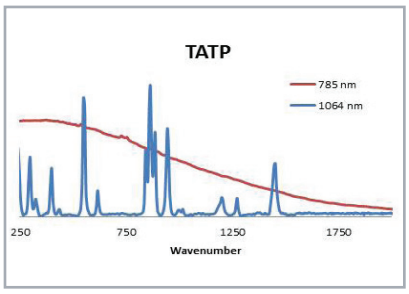


Figure 1. Raman spectra of TATP using 1064nm (blue) and 785nm (red).

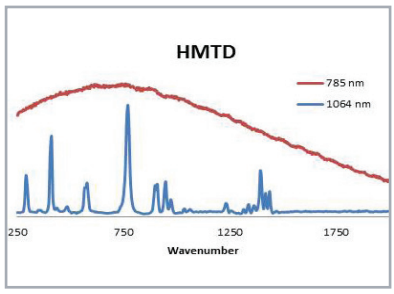


Figure 2. Raman spectra of HMTD using 1064nm (blue) and 785nm (red).

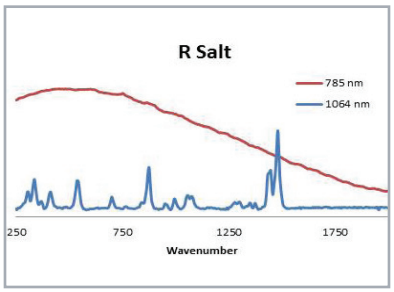


Figure 3. Raman spectra of R-Salt using 064nm (blue) and 785nm (red).

CONCLUSION

The handheld Progeny ResQ has the ability to identify commercial and HMEs, as well as precursors. Because Progeny ResQ uses a 1064nm laser excitation, it can measure colored materials without interference.

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