

Accepted Manuscript

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PII: S1386-1425(18)30533-X
DOI: doi:[10.1016/j.saa.2018.06.002](https://doi.org/10.1016/j.saa.2018.06.002)
Reference: SAA 16161

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 10 April 2018
Revised date: 31 May 2018
Accepted date: 1 June 2018

Please cite this article as: Félix Zapata, Marta Ferreiro-González, Carmen García-Ruiz, Interpreting the near infrared region of explosives. Saa (2017), doi:[10.1016/j.saa.2018.06.002](https://doi.org/10.1016/j.saa.2018.06.002)

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Interpreting the Near Infrared region of explosives

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Abstract.

The NIR spectra from 1000 to 2500 nm of 18 different explosives, propellant powders and energetic salts were collected and interpreted. NIR spectroscopy is known to provide information about the combination bands and overtones of highly anharmonic vibrations as those occurring in X-H bonds (C-H, N-H and O-H). Particularly intense and complex were the bands corresponding to the first combination region (2500-1900 nm) and first overtone stretching mode (2ν) of C-H and N-H bonds (1750-1450 nm). Inorganic oxidizing salts including sodium/potassium nitrate, sodium/potassium chlorate, and sodium/potassium perchlorate displayed low intense or no NIR bands.

Keywords: explosives; energetic powders; near infrared spectroscopy; combination region; overtone.

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