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Spike detection algorithms for Raman spectroscopy: A comparative study

For most applications based on Raman spectroscopy, spike detection and removal are required steps in data pre-processing [1]. Spike detection algorithms can be categorized depending on whether they rely on several spectra for comparison among them or they can be used with a single spectrum. The first ones require a minimal difference between adjacent spectra, whereas the second type offers greater versatility. In this study, several single-spectrum algorithms for spike detection are compared. The sensitivity of each method is evaluated across various types of spectra, different spike positions within a spectrum and different levels of noise. Furthermore, their suitability in terms of ease of implementation and computational time is also discussed.

References

- [1] Barton et al., Appl. Spectrosc. 76, (2022) 1021-1041
- [2] Whitaker et al., Chemom. Intell. Lab. Syst., 179, (2018) 82-84
- [3] Maury et al., Appl. Spectrosc. 69(8), (2015), 984-992

Figures

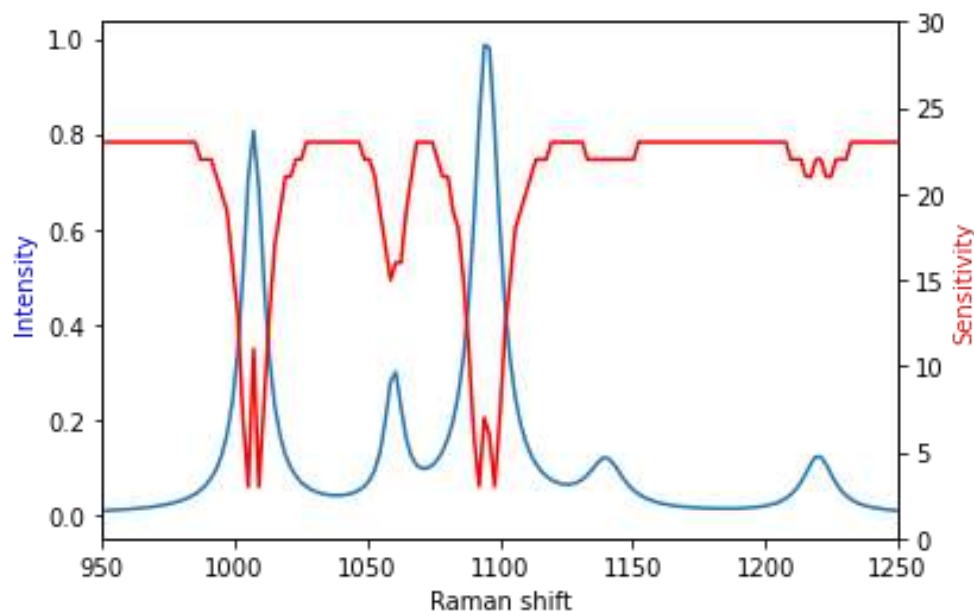


Figure 1: The blue line shows a spectrum presenting several Raman bands. The red line corresponds to the sensitivity of a given spike detection algorithm, where the sensitivity was defined as the minimum spike intensity to be detected, in percentage of the most intense Raman band intensity.