

Differentiation between isopropyl alcohol from various manufacturers

This Application Note shows the rapid, non-destructive identification of isopropyl alcohol from two manufacturers using Raman spectroscopy following the creation of a suitable

library. The measurements with the handheld Raman spectrometer Mira M-1 require no sample preparation and provide immediate results that identify the samples unambiguously.

INTRODUCTION

Organic solvents like isopropyl alcohol are required in the production of many beauty and cosmetic products, paints, fragrances, and in synthesis reactions – the latter in particular in pharmaceutical applications.

In this work, isopropyl alcohol samples from two

different suppliers were analyzed and the differences in the spectra were investigated. Unexpectedly, the spectra showed some differences, allowing a supplier-specific identification.

EXPERIMENTAL

All spectra were measured using the Mira M-1 Raman spectrometer in auto-acquisition mode, i.e., integration times were determined automatically. A laser wavelength of 785 nm

and the Orbital-Raster-Scan (ORS) technique were used. The isopropyl alcohol samples were analyzed in vials using the vial holder attachment of the Mira M-1.

RESULTS AND DISCUSSION

Two different suppliers of isopropyl alcohol were evaluated. Due to the visible differences in the spectra indicating a possible contamination of

the samples the Raman spectroscopic distinction was possible (see **Figure 1**).

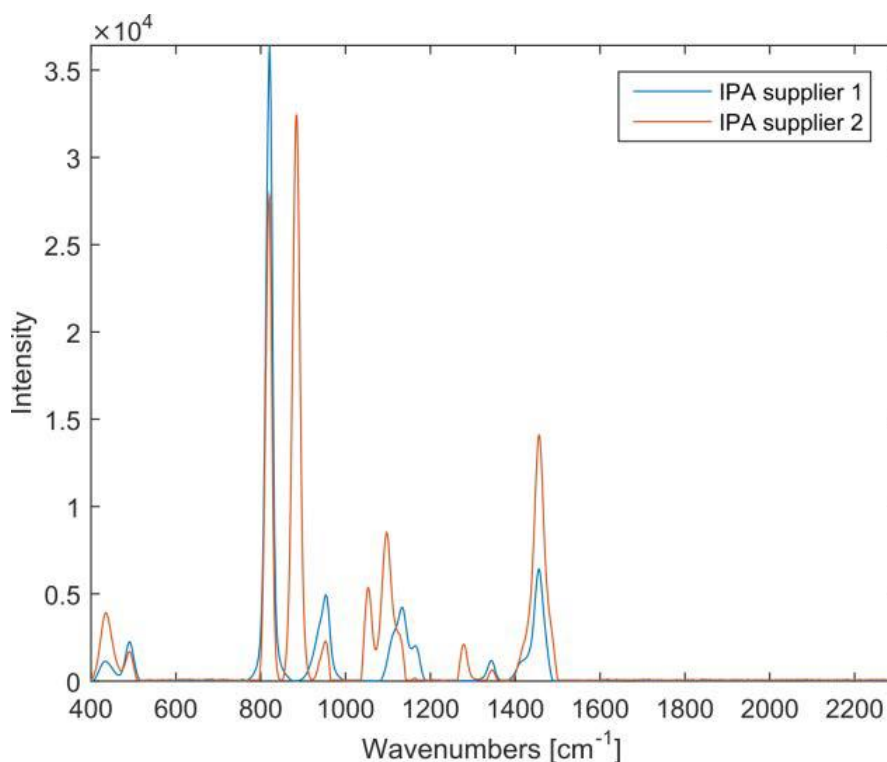


Figure 1. Spectra of isopropyl alcohol (Supplier 1 and 2) superimposed with a spectrum of ethyl alcohol

The peaks at $1400\text{--}1470\text{ cm}^{-1}$ correspond to the asymmetric vibrations of $\delta(\text{CH}_2)$ and $\delta(\text{CH}_3)$. Between $600\text{--}1300\text{ cm}^{-1}$, aliphatic chain vibrations for $\nu(\text{CC})$ can be found. In both samples of isopropyl alcohol, peaks in those areas can be observed.

Changes come up when focusing on the peaks at $883, 1049, 1095,$ and 1276 cm^{-1} , since those peaks, according to literature, suggest the presence of ethyl alcohol in the sample (see **Figure 2**).

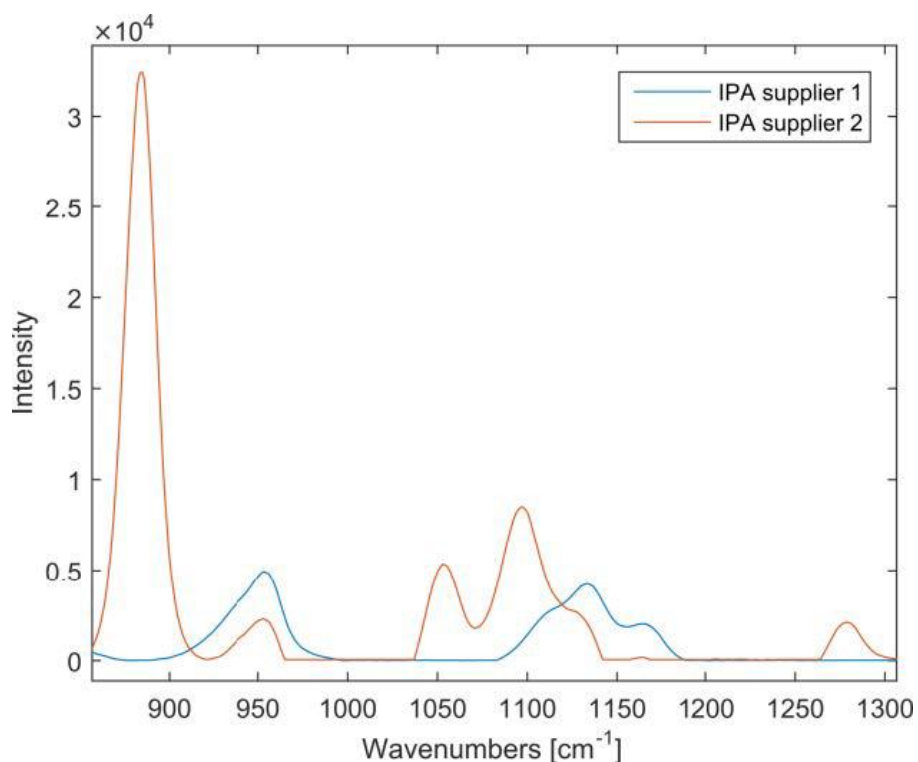


Figure 2. Differences between the isopropyl alcohol spectra.

CONCLUSIONS

Comparing the spectra of the two isopropyl alcohol samples, it becomes obvious that there is ethyl alcohol in the isopropyl alcohol sample of supplier 2. With Mira M-1, it was possible to

distinguish the different suppliers, proving that Mira M-1 is suited for the identification of incoming raw materials such as solvents and alcohols.

CONTACT

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CONFIGURATION



MIRA P Advanced

Metrohm Instant Raman Analyzer (MIRA) Pは、迅速な非破壊的計測および薬品有効成分や賦形剤などの様々な物質の検査に使用できる、高性能な携帯型ラマン分光計です。サイズはコンパクトですが、MIRA Pは非常に堅固で、弊社独自の軌道ラスタースキャン技術 (Orbital Raster Scan Technologie, ORS) を備えた作業効率の高い分光技術構造を有しています。MIRA PはFDA規則 21 CFR Part 11の要件を満たしています。

Advanced Packageには、物質を直接、またはオリジナル容器で分析することか可能なアタッチメントレンズ (レーサークラス3b)、およびカラスハイアル中のサンプル分析のためのハイアルホルターアタッチメント (レーサークラス1) が含まれています。