All data taken at Pacific Northwest National Laboratory (PNNL)

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SAMPLE CONDITIONS & PHYSICAL PROPERTIES

Chemical name: Erythromycin
Chemical formula: C₃₇H₆₇NO₁₃
Synonyms: n/a
CAS number: 114-07-8
Location of field sample: n/a
History of sample: n/a
Molecular Weight: 733.93 g/mol
Melting Point: 133 °C
Boiling Point: n/a
Density (25°C): 1.096 g/cm³
Hardness, Mohs scale: n/a
Crystallography:
   Cell dimension: a = Å  b = Å  c = Å
   Crystal system
   H-M symbol (point gr)
   Space group
   H-M symbol (space gr)
   Crystal habit
Color: White
Diaphaneity: Sub-translucent to opaque
Particle size: 15 ± 13 µm
Particle size assessment: Optical microscopy
Supplier: Sigma-Aldrich
Stated purity: ≥ 95%
Date packed: 02 May 2016  Weight: 0.722 grams
Synthesis method: n/a
Synthesis reference: n/a
Texture: Crystalline powder
Physical state: Solid
Surface roughness: n/a
Elemental composition: n/a
Isotopic composition: n/a
Moisture content: n/a
Temperature of sample: 25 ± 2 °C
Substrate: n/a
**INSTRUMENT PARAMETERS**

**Tensor 37 FT-IR manufactured by Bruker Optics**

External diffuse reflectance accessory: A 562-G integrating sphere

Sphere diameter: 75 mm

Angle to normal incidence: 14.8°

Sphere opening diameter: 19 mm (entrance port)

Spectral range: 7,500 to 600 cm⁻¹ saved; 7500 to 600 cm⁻¹ reported

Beamsplitter: Ge on KBr

Detector (dia. Det. Port in sphere): 2×2 mm, 60° field of view MCT (550; 0.9); 1 cm

Apodization function: Blackman-Harris 3-term

Aperture: 6 mm

Coadded scans: 2048

Scanner speed: 40 kHz

Switch gain on: 512 points

Low pass filter: Open

Scan technique: double-sided, forward-backward

Non-linear correction: On

High and low folding limit: 15800.54-0.00 cm⁻¹

Phase resolution: 32.00

Phase correction mode: Mertz

Zerofilling: 4×

Wavenumber accuracy: ± 0.4 cm⁻¹

Spectral resolution: 4 cm⁻¹

Accuracy verification: 10/28/2015

Wavelength vetted on: ICL polystyrene standard #0009-7394-0025A, thin film

Reflectance: ±2% using SRS reflectance standards 50-010-DH27B-4878

Figure 1: The Bruker 562-G integrating sphere (a) and Tensor 37 (b)
Photographs of sample Erythromycin

Figure 2: Erythromycin in Sigma-Aldrich container.

Figure 3: Erythromycin loaded in IR sample cup.
PARTICLE SIZE PREPARATION AND CHARACTERIZATION

Optical microscopy —

A Keyence VHX-1000 digital microscope with 16-bit resolution is used to provide photomicrographs of the various samples and particle sizes. Software included with the microscope differentiates the brightness and colors in the image and extracts the bright objects to produce a binary image. The software assumes all adjacent bright points are part of the same object then calculates the area for each of these objects. The area (A) is used to calculate the mean particle diameter (d) by assuming the particles are spherical and using the relationship $d=(4A/\pi)^{1/2}$. Although the assumption of spherical particles is clearly not always valid, this procedure provides a reasonable estimate of the mean particle size.

Figure 4: Photomicrograph of Erythromycin.
Figure 5: Particle size distribution of Erythromycin.