

All data taken at Pacific Northwest National Laboratory (PNNL)

Operators: Jerome C. Birnbaum, Timothy J. Johnson, Rodica Lindenmaier, Tanya L. Myers

SAMPLE CONDITIONS & PHYSICAL PROPERTIES

Chemical name	2-Benzylaminopyridine	
Chemical formula	$(C_5H_4N)NH(CH_2C_6H_5)$ or $C_{12}H_{12}N_2$	
Synonyms	Benzyl pyridyl amine	
CAS number	6935-27-9	
Location of field sample	n/a	
History of sample	n/a	
Molecular Weight	184.24 g/mole	
Melting Point	95-97 °C	
Boiling Point	116-131 °C/0.6 mmHg	
Density (25° C)	1.219 g/cm ³	
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/slight off-white	
Diaphaneity	Sub-translucent to opaque	
Particle size	138 ± 44 µm	
Particle size assessment	Optical microscopy	
Supplier	Aldrich	
Stated purity	98%	
Date packed	01 December 2015	Weight: 1.434 grams
Synthesis method	n/a	
Synthesis reference	n/a	
Texture	Hard solid of irregular shaped crystals	
Physical state	Ground and sieved crystalline 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	$\pm 0.4 \text{ cm}^{-1}$
Spectral resolution	4 cm^{-1}
Accuracy verification	12/01/2015
Wavelength vetted on:	ICL polystyrene standard #0009-7394-0025A, thin film
Reflectance:	$\pm 2\%$ using SRS reflectance standards 50-010-DH27B-4878

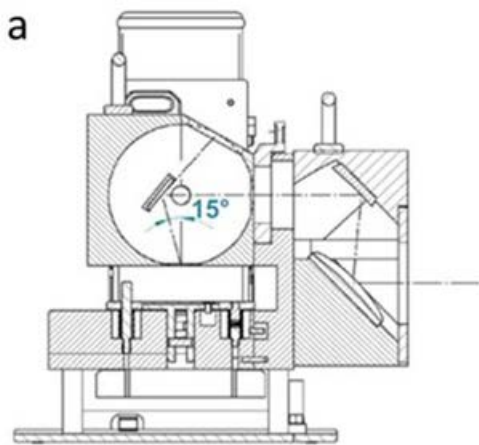


Figure 1: The Bruker 562-G integrating sphere (a) and Tensor 37 (b)

Photographs of sample 2-Benzylaminopyridine 90-180 μm crystals

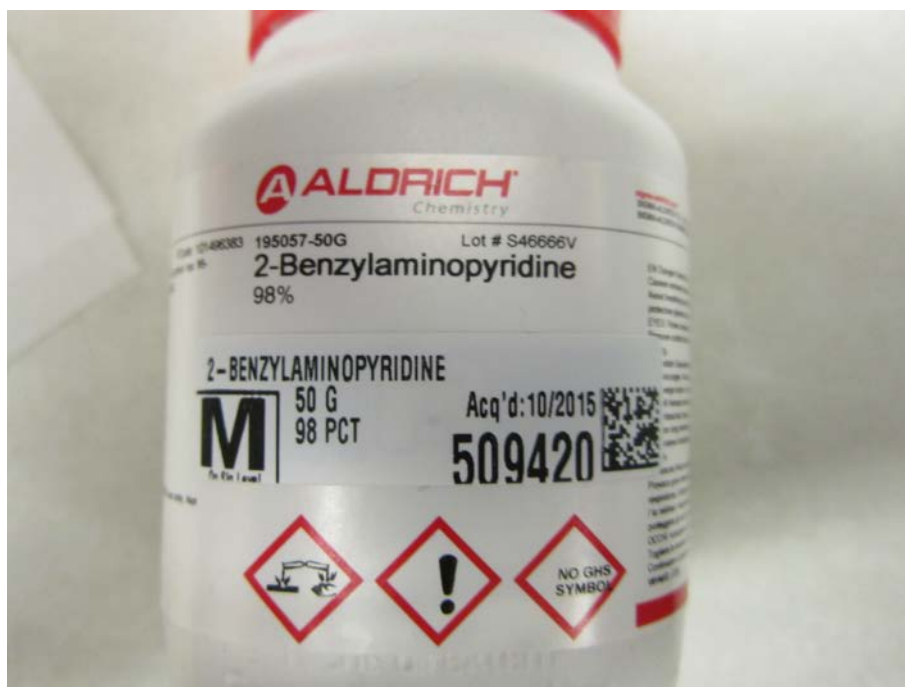


Figure 2: 2-Benzylaminopyridine in Aldrich container.



Figure 3: 2-Benzylaminopyridine 90-180 μm sample loaded in IR sample cup.

PARTICLE SIZE PREPARATION AND CHARACTERIZATION

Sieve analysis —

A sonic sifter separator from Advantech is used to sieve the sample that is ground with a mortar and pestle for particle size analysis. For these measurements, five different sieve sizes were employed: 500 μm , 250 μm , 180 μm , 90 μm , and 45 μm to achieve six particle size distributions: > 500 μm , 500-250 μm , 250-180 μm , 180-90 μm , 90-45 μm , and 45-0 μm .

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 $d = (4 * A / \pi)^{1/2}$. Although the assumption of spherical particles is clearly not always valid, this procedure provides a reasonable estimate of the mean particle size.

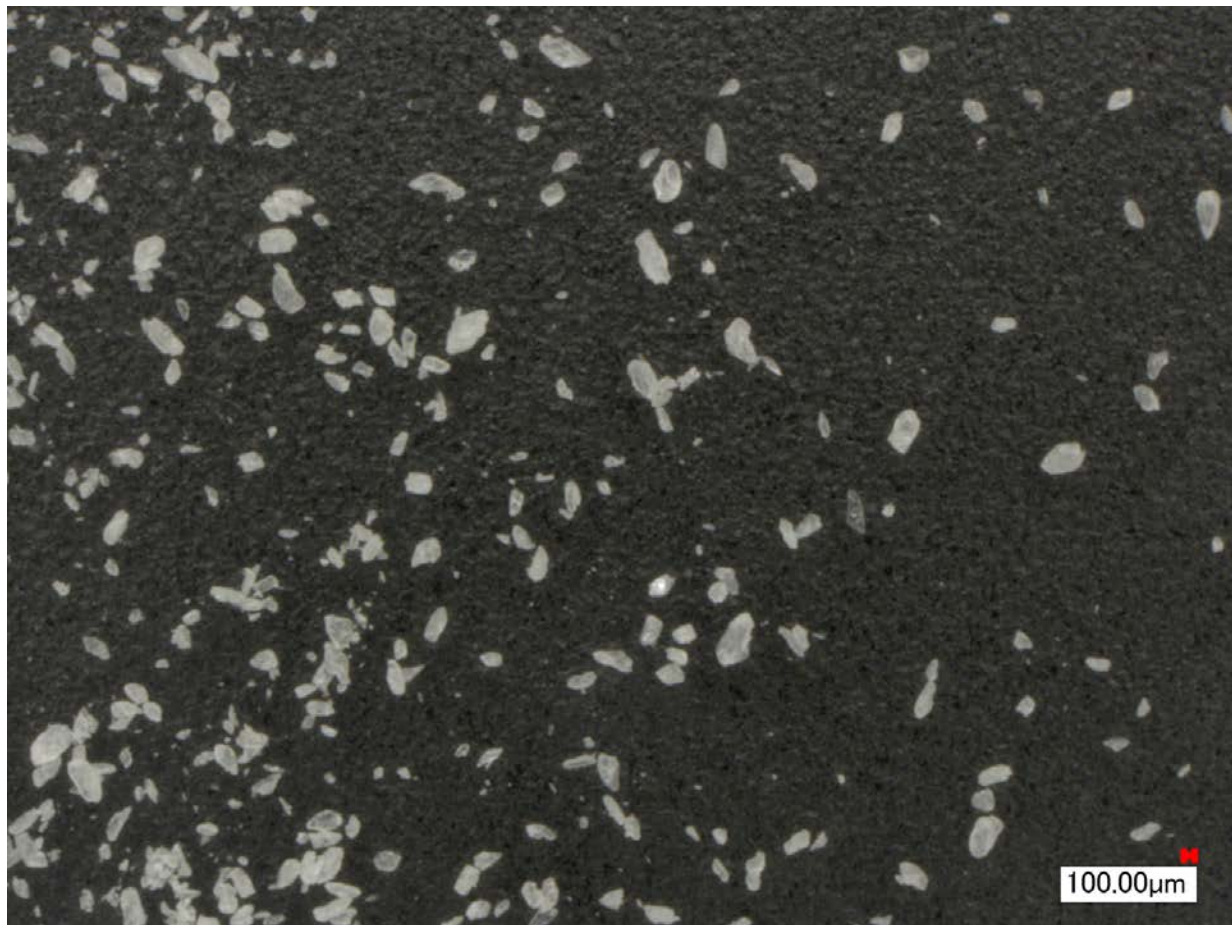


Figure 4: Photomicrograph of 2-Benzylaminopyridine 90-180 μm crystals.

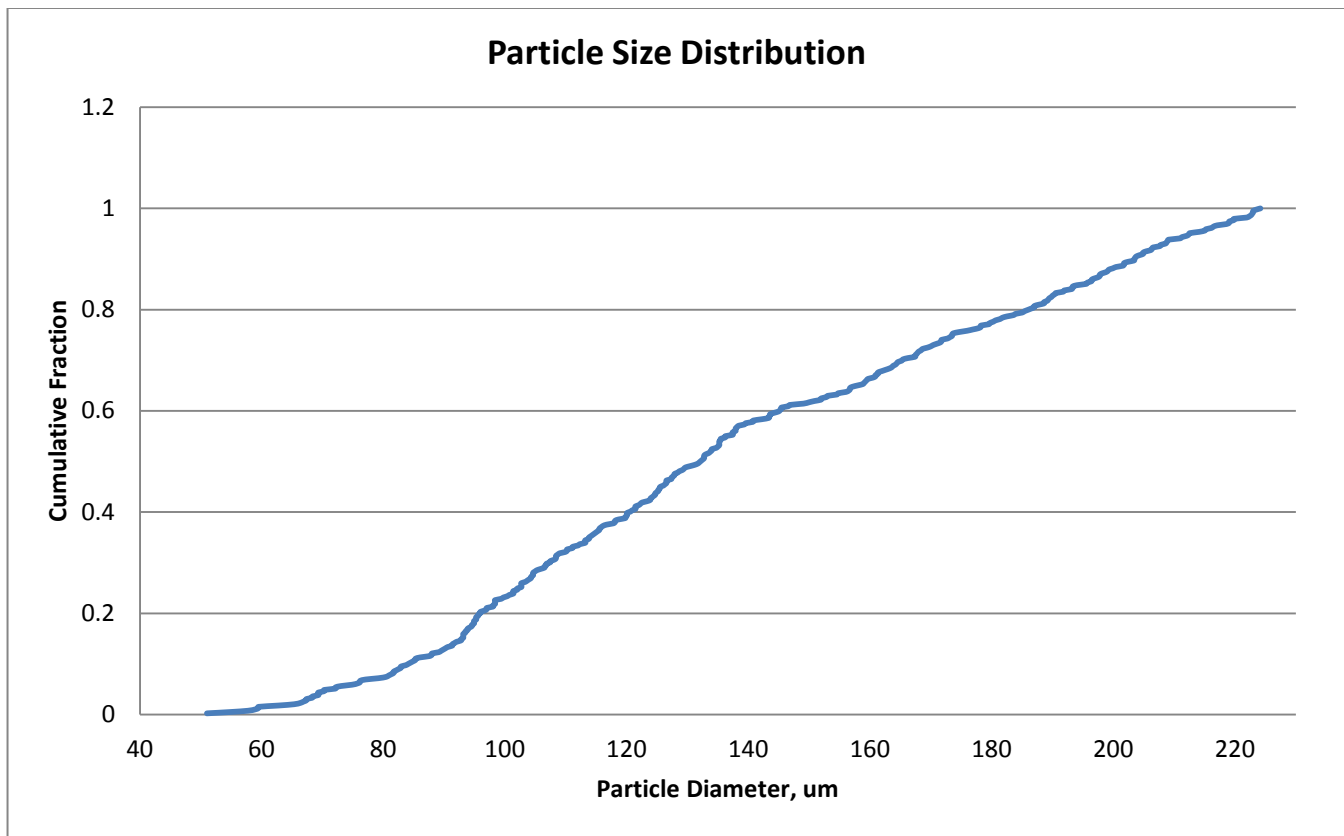


Figure 5: Particle size distribution of 2-Benzylaminopyridine 90-180 μm crystals.