

Raman tensor of AlN bulk single crystal: erratum

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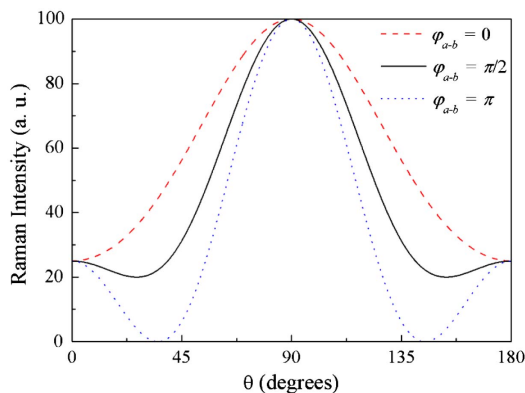


Fig. 2. Simulated Raman intensity according to Eq. (7) for an A_1 phonon measured on the m -plane surface of a crystal with wurtzite-type structure. θ is the rotated angle between the y axis of the sample and the polarization vector of incident light. The values of the parameters $|a|$ and $|b|$ for all curves are assumed as 5 and 10, respectively, and the value of phase difference φ_{a-b} varies from 0 (top curve) to π (bottom curve) with a step of $\pi/2$.

The authors wish to correct the errors related to the description of the experimental optical path polarization in Ref. [1], as well as several simple writing errors, so as to avoid misleading during reading process. The errors relevant to polarization are due to the inconformity between the direction given by the instrument and the actual one, but the scientific discussion is not affected. The details of the correction are as follows.

1. The polarization direction of the optical path given by the instrument is 90° different from the actual polarization direction, so the positions of a and b measured by the experiment should be changed.

• Page 39. The angle θ shall be corrected to the angle between the polarization vector of incident light and the y axis; the polarization vectors e_i and e_s of the incident light and the scattered light shall be changed to $(0, \cos \theta, \sin \theta)$ during the m -plane test; the Raman intensity of the corresponding A_1 vibration mode shall be changed to $I_{A_1}^{\parallel}(\theta) \tilde{|a|}^2 \cos^4 \theta + |b|^2 \sin^4 \theta + \frac{1}{2} |a||b| \sin^2(2\theta) \cos(\varphi_{a-b})$.

Table 1. Relative Values of the Raman Tensor Elements of A_1 , E_1 , and E_2 Modes in Wurtzite AlN are Extracted from the Theoretical Fits to Angle-Dependent Raman Spectra for Parallel and Perpendicular Polarization Vectors of the Incoming Laser (e_i) and the Scattered Light (e_s)^a

Raman Tensor Elements			$e_i \parallel e_s$		$e_i \perp e_s$	
			AlN	ZnO (Ref. [26])	AlN	ZnO (Ref. [26])
m -plane	A_1 (TO)	$ a/d $	0.730 ± 0.008	0.611 ± 0.006	0.746 ± 0.004	0.585 ± 0.022
	A_1 (TO)	$ b/d $	1.818 ± 0.011	0.599 ± 0.005	1.846 ± 0.005	0.413 ± 0.039
	A_1 (TO)	φ_{a-b}	91.24°	93.00°	91.18°	104.00°
	E_1 (TO)	$ c/d $	0.475 ± 0.007	0.424 ± 0.004	0.510 ± 0.003	0.404 ± 0.001
c -plane	E_2^2	$ d/d $	1.000 ± 0.009	1.000 ± 0.002	1.000 ± 0.004	1.000 ± 0.004
	A_1 (LO)	$ a/d $	0.408 ± 0.004	0.121 ± 0.001	—	—
	E_2^2	$ d/d $	1.000 ± 0.008	1.000 ± 0.002	—	—

^aRaman tensor elements for all phonon modes are normalized to that of the E_2 mode.

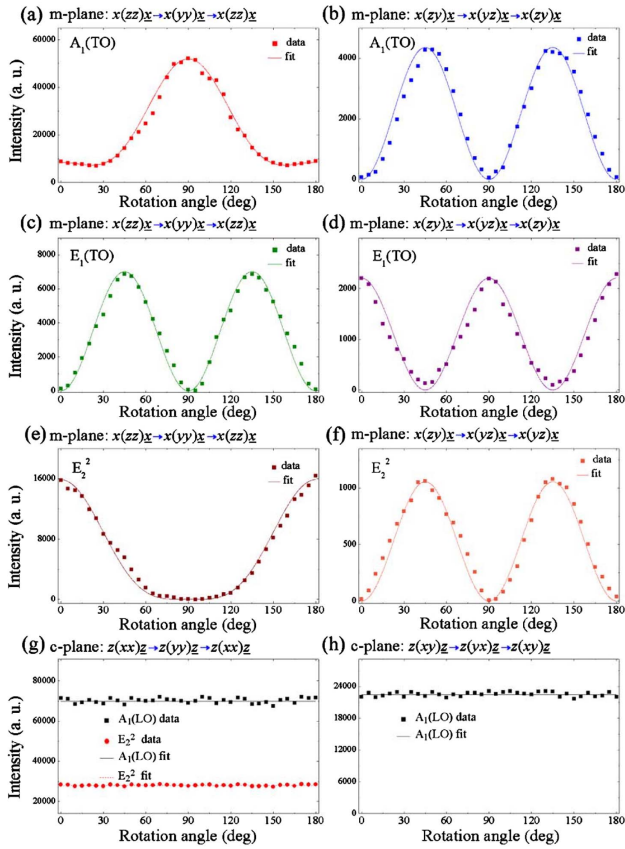


Fig. 4. (a) and (b) show the angle-dependent intensity of the $A_1(\text{TO})$ signal from the m -plane surface of the AlN sample for parallel and perpendicular polarization vectors of the incoming laser and the scattered light, respectively. The solid lines fit for determination of parameters $|a|$ and $|b|$ and φ_{a-b} based on Eqs. (10) and (14). (c) and (d) show the intensity of the $E_1(\text{TO})$ signal from the m -plane surface versus the rotation angle for parallel and perpendicular polarization vectors, respectively, while (e) and (f) present the intensity of the E_2^2 signal versus the rotation angle for different polarizations. (g) and (h) record the angle-independent intensity of $A_1(\text{LO})$ and E_2^2 signals from the c -plane surface of the AlN sample for parallel and perpendicular polarizations versus the rotation angle ω .

- Page 40. The angle θ mentioned in Fig. 2 shall also be corrected to the angle between the polarization vector of incident light and the y axis
- Page 42. The values of $|a|$ and $|b|$ in Table 1 as well as the discussion on $|a|$ and $|b|$ data involved in Table 1 should be exchanged.

2. Some simple writing errors.

- Page 39. The calculation error of the Raman intensity of E_1 mode in m -plane parallel polarization configuration should be corrected to $I_{E_1}^{\parallel}(\theta)|\tilde{c}|^2 \sin^2(2\theta)$, but the constant 1/2 in the original paper does not affect the discussion of this mode.
- Page 40. Figure 2 shows a fixed value of $|a|$ and $|b|$. However, in the third part of the Raman Selection Rules, the ‘one particular choice of values $|a|$ and $|b|$ ’ is miswritten as ‘one particular choices of values $|a|$ and $|c|$ ’.
- Page 41. In the Figure 4 caption, ‘the angle-independent intensity of $A_1(\text{LO})$ and E_2^2 signals from the c -plane surface of the AlN sample for parallel and perpendicular polarizations versus the rotation angle ω ’ describes the Figs. 4(g) and 4(h).

REFERENCE

1. W. Zheng, R. Zheng, F. Huang, H. Wu, and F. Li, “Raman tensor of AlN bulk single crystal,” *Photon. Res.* **3**, 38–43 (2015).