

Liquid Surface X-ray Scattering User Help

Measured β Offset

Small and random
Constant with increasing angle
needed
Increasing with increasing angle
needed

Calls for...

A smiling face, Good!
Correction to zero angle correction
Correction to geometry parameter

Find g₁₂. Perform sample height scans for a number of different α 's (like 0.03, 0.05, 0.10, 0.15) and determine the sample height (negative number) corresponding to the center of each scan. Determine g₁₂ in same manner as g₁₁.

Find g₁₃. Perform an oscan for four different α 's and determine OH for each angle. Perform a fit, using the value of g₁₂ that you determined in the previous step.

$$\tan\alpha = (\text{SH}-\text{OH}) / (\text{g}_{13})$$

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$$\text{but, SH} = (\text{g}_{12})\tan\alpha = (\text{g}_{12})(\alpha)$$

$$\text{so, } \alpha = [(\text{g}_{12})(\alpha) - \text{OH}] / (\text{g}_{13})$$

$$\text{OH} = (\text{g}_{12} - \text{g}_{13})(\alpha)$$

Therefore, for linear fit to graph OH versus α , the slope = (g₁₂ - g₁₃)

SPEC Cheat Sheet for the Geometric Alignment of the Liquid Surface Spectrometer

(Align the beam to be parallel with the surface of the sample and determine g₁₁, g₁₂ and g₁₃)

A) Alignment for g₁₁

- SURF> g_trck=0;pa (to disable oh or sh)
- SURF>s1v 0.01 0.01,s1h 1.5 1.5
- SURF>DET=monc; plotselect monc
- SURF>umk 0 0 0
- SURF>dscan ih -0.3 0.3 20 1
- SURF>umv ih CEN;set ih 0
- SURF>umk 0 0 0.05
- SURF>dscan iscan -0.5 0.5 20 1
- SURF>umk 0 0 0.1
- SURF>dscan iscan -0.5 0.5 20 1
- ...continue (Repeat the iscan to an angle as far as your experiment requires.)
- SURF> g_trck=1;pa (enable oh or sh)
- Use IDL to obtain g₁₁ value (see IDL cheat sheet), input g₁₁ in SPEC, and then check the alignment at a few angles.

B) Zero_angle procedure

- (mv sh to cut incident intensity by 1/2 and set sh 0)
- SURF>s1v 0.01 0.01; s1h 1.5 1.5;s2v 1 1;s2h 2 2;s3v 1 1;s3h 2 2
- SURF>DET=det;plotselect det
- SURF>abs 41
- SURF>umv sh -2
- SURF>dscan oh -1.5 1.5 20 1
- SURF>umv oh CEN;set oh 0
- SURF>umi 0.35 0.35
- SURF>wh

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- j. SURF>abs 20
 - k. SURF>shscan 0.4 20 1
 - l. SURF>umv sh CEN; set sh NOM
 - m. SURF>dscan oh -1.5 1.5 20 1
 - n. SURF>abs 40
 - o. SURF>zero_angle
 - p. Record mi value on the screen to note the correction for alpha.
 - q. Repeat from a) to n)
- C) Alignment for g₁₂ and g₁₃
- a. SURF>s1v 0.01 0.01; s1h 1.5 1.5; s2v 1 1; s2h 2 2; s3v 1 1; s3h 2 2
 - b. SURF>DET=det; plotsselect det
 - c. SURF>abs 41
 - d. SURF>umi 0 0
 - e. SURF>umv sh -1
 - f. SURF>dscan oh -1.5 1.5 20 1
 - g. SURF>umv oh CEN; set oh 0
 - h. SURF>umk 0.35 0.35
 - i. SURF>wh
 - j. SURF>abs 20
 - k. SURF>shscan 0.7 20 1
 - l. SURF>umv sh CEN; set sh NOM
 - m. SURF>oscan 1.5 20 1
 - n. SURF>umi 1 1
 - o. SURF>wh
 - p. SURF>abs 10
 - q. SURF>shscan 1.2 20 1
 - r. SURF>umv sh CEN
 - s. SURF>oscan 1.57 20 1
 - t. SURF>umi 2 2
 - u. SURF>wh
 - v. SURF>abs 0
 - w. SURF>shscan 2.4 20 1
 - x. SURF>umv sh CEN
 - y. SURF>oscan 1.5 20 1
 - z. SURF>umi 3 3
 - aa. SURF>wh
 - bb. SURF>abs 0
 - cc. SURF>shscan 2.4 20 1
 - dd. SURF>umv sh CEN
 - ee. SURF>oscan 1.5 20 1
 - ff. Continue the measurements until shscan measurement is impossible.
 - gg. Use IDL to find g₁₂ and g₁₃ (see IDL cheat sheet), input them in SPEC, and then check the alignment at a few angles.