

Activation and Scattering Results

Scattering from TiO₂

Source neutrons: 1.000 Å = 81.80 meV = 3956 m/s

Source X-rays: 1.542 Å = 8.042 keV

Sample in beam: TiO₂ at 4.23 g/cm³

1/e penetration depth (cm)	Scattering length density (10 ⁻⁶ /Å ²)	Scattering cross section (1/cm)	X-ray SLD (10 ⁻⁶ /Å ²)
abs	9.256	real	2.628
abs+incoh	2.347	imag	-0.001
abs+incoh+coh	1.935	incoh	4.921
		coh	0.091
		abs	0.108
		incoh	0.318

Neutron transmission is 65.31% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 6.531e+7 n/cm²/s for a 1e8 n/cm²/s beam.

Contrast match point: 45.9% D₂O by volume (real SLD = 2.628×10⁻⁶/Å²)

Scattering from Ti

Source neutrons: 1.000 Å = 81.80 meV = 3956 m/s

Source X-rays: 1.542 Å = 8.042 keV

Sample in beam: Ti at 4.51 g/cm³

1/e penetration depth (cm)	Scattering length density (10 ⁻⁶ /Å ²)	Scattering cross section (1/cm)	X-ray SLD (10 ⁻⁶ /Å ²)
abs	5.208	real	-1.910
abs+incoh	2.796	imag	-0.001
abs+incoh+coh	2.280	incoh	2.734
		coh	0.081
		abs	0.192
		incoh	0.166

Neutron transmission is 69.93% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 6.993e+7 n/cm²/s for a 1e8 n/cm²/s beam.

Contrast match point: < 0% D₂O

Scattering from Si

Source neutrons: 1.000 Å = 81.80 meV = 3956 m/s

Source X-rays: 1.542 Å = 8.042 keV

Sample in beam: Si at 2.33 g/cm³

1/e penetration depth (cm)	Scattering length density (10 ⁻⁶ /Å ²)	Scattering cross section (1/cm)	X-ray SLD (10 ⁻⁶ /Å ²)
abs	210.550	real	2.073
abs+incoh	206.179	imag	-0.000
abs+incoh+coh	8.852	incoh	0.063
		coh	0.108
		abs	0.005
		incoh	0.000

Neutron transmission is 99.52% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 9.952e+7 n/cm²/s for a 1e8 n/cm²/s beam.

Contrast match point: 37.9% D₂O by volume (real SLD = 2.073×10⁻⁶/Å²)

Scattering from 49%wt Fe // 49%wt Co // V

Source neutrons: 1.000 Å = 81.80 meV = 3956 m/s

Source X-rays: 1.542 Å = 8.042 keV

Sample in beam: Fe_{22.34876443728176}Co_{21.177651137219765}V at 8.29 g/cm³

1/e penetration depth (cm)	Scattering length density (10 ⁻⁶ /Å ²)	Scattering cross section (1/cm)	X-ray SLD (10 ⁻⁶ /Å ²)
abs	1.079	real	5.167
abs+incoh	0.773	imag	-0.005
abs+incoh+coh	0.596	incoh	5.054
		coh	0.384
		abs	0.927
		incoh	0.368

Neutron transmission is 97.41% for 1 cm of sample (after absorption and incoherent scattering).

Neutron transmission is 27.41% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 2.741×10^7 n/cm²/s for a 1×10^8 n/cm²/s beam.

Contrast match point: 82.4% D₂O by volume (real SLD = $5.167 \times 10^{-6}/\text{\AA}^2$)

Scattering from 85.063%wt Ni // Mo

Source neutrons: $1.000 \text{ \AA} = 81.80 \text{ meV} = 3956 \text{ m/s}$

Source X-rays: $1.542 \text{ \AA} = 8.042 \text{ keV}$

Sample in beam: Ni_{9.308672697961754}Mo at 9.08 g/cm^3

1/e penetration depth (cm)	Scattering length density ($10^{-6}/\text{\AA}^2$)	Scattering cross section (1/cm)	X-ray SLD ($10^{-6}/\text{\AA}^2$)
abs	4.772	coh	real 65.927
abs+incoh	1.583	abs	imag -1.831
abs+incoh+coh	0.580	incoh	

Neutron transmission is 53.16% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 5.316×10^7 n/cm²/s for a 1×10^8 n/cm²/s beam.

Contrast match point: > 100% D₂O

Scattering from 90.3%wt Ni // Mo

Source neutrons: $1.000 \text{ \AA} = 81.80 \text{ meV} = 3956 \text{ m/s}$

Source X-rays: $1.542 \text{ \AA} = 8.042 \text{ keV}$

Sample in beam: Ni_{15.216909651655099}Mo at 9.01 g/cm^3

1/e penetration depth (cm)	Scattering length density ($10^{-6}/\text{\AA}^2$)	Scattering cross section (1/cm)	X-ray SLD ($10^{-6}/\text{\AA}^2$)
abs	4.627	coh	real 65.387
abs+incoh	1.524	abs	imag -1.661
abs+incoh+coh	0.558	incoh	

Neutron transmission is 51.87% for 1 cm of sample (after absorption and incoherent scattering).

Transmitted flux is 5.187×10^7 n/cm²/s for a 1×10^8 n/cm²/s beam.

Contrast match point: > 100% D₂O

Questions?

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Scattering calculations: Paul Kienzle <paul.kienzle@nist.gov>

Last modified 25-March-2024 by website owner: NCNR (attn:)

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