Anomalous Scatter

Spectral BRDF Measurements of:

O-30 HIP Be

O-30 VHP Be

SiC Slurry Coated C-SiC

Si Clad SiC

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BRDF Samples

Anomalous Scatter

- Optical surface ‘appears’ to have a different roughness as function of wavelength.
  - *i.e. Scatters different wavelengths differently*
- Effect is evident when BRDF is converted into PSD space.

4 Different 75 mm diameter samples – all polished

- O-30 HIP Beryllium – polished by Tinsley
- O-30 VHP Beryllium
- Silicon Carbide Slurry Overcoat of C-SiC
- Silicon Clad Silicon Carbide

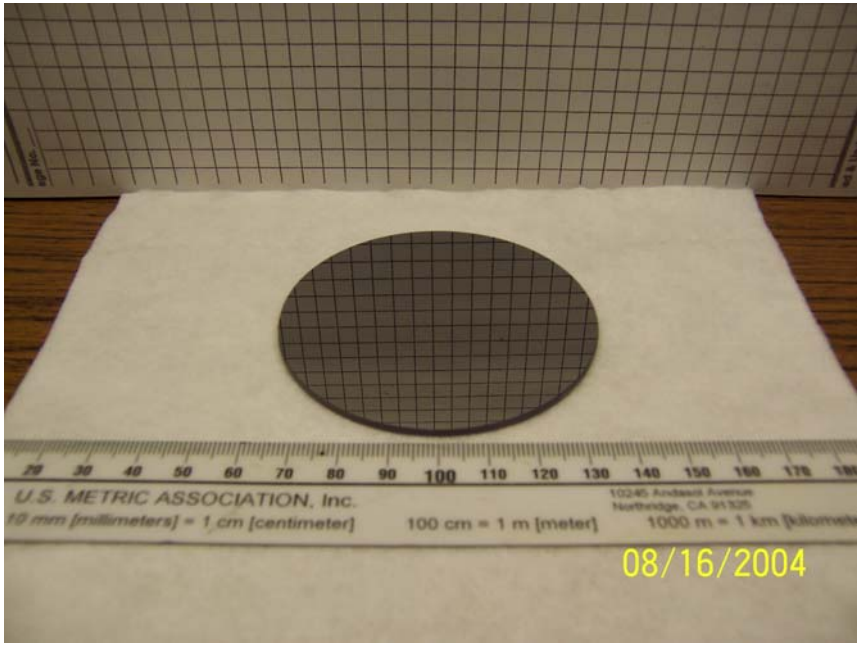
BRDF Measured by Schmitt Measurement Systems, Inc.

- 0.633, 1.064, 3.39 and 10.6 micrometers

BRDF Converted to PSD

- Edited Data for Saturation, Obscuration and 1/Cos Effect

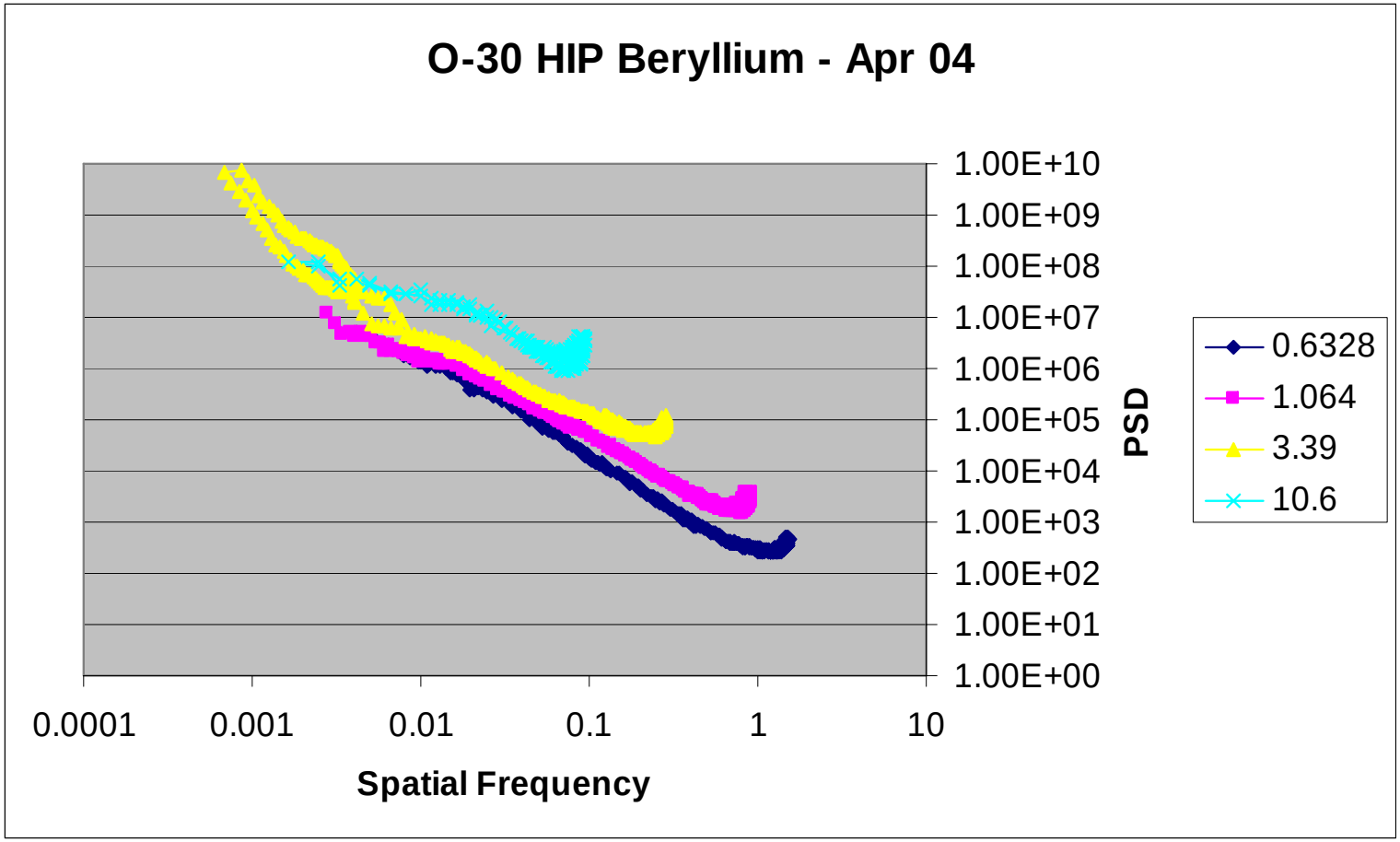
O-30 HIP Beryllium



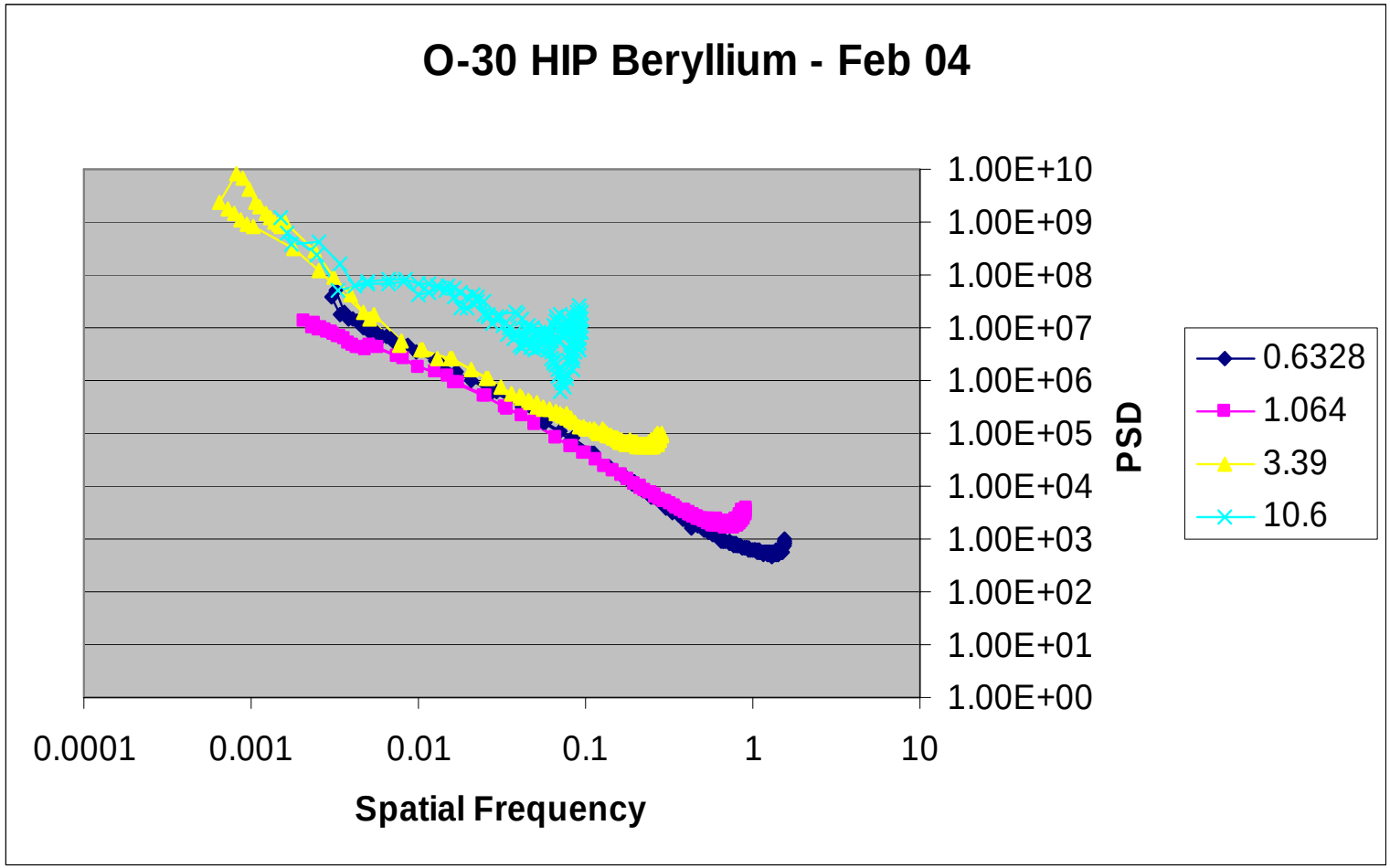
Surface Roughness

Ave RMS	Objective
1.5 nm	20X
0.93 nm	2.5X

Polished by Tinsley

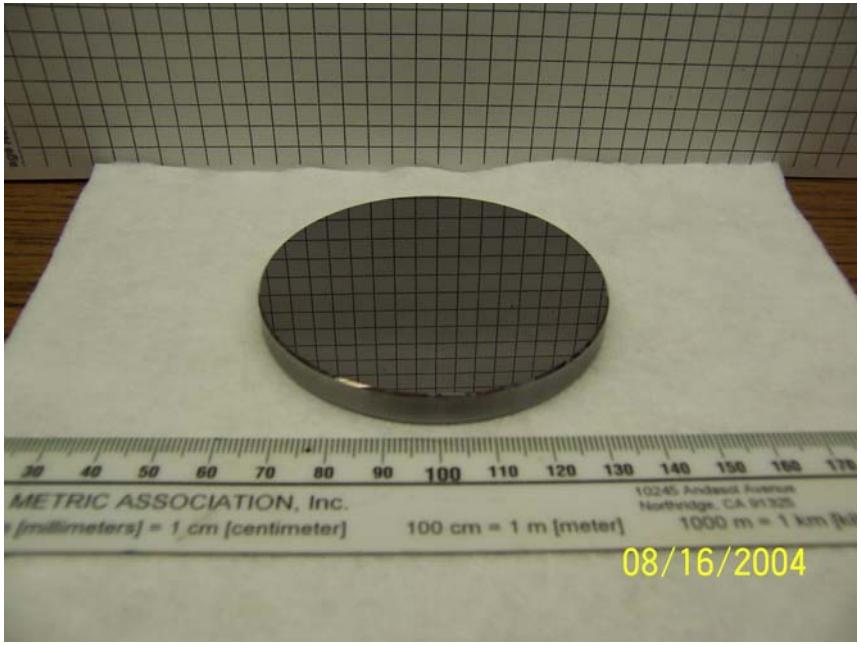


Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.460	0.541	0.932	0.960



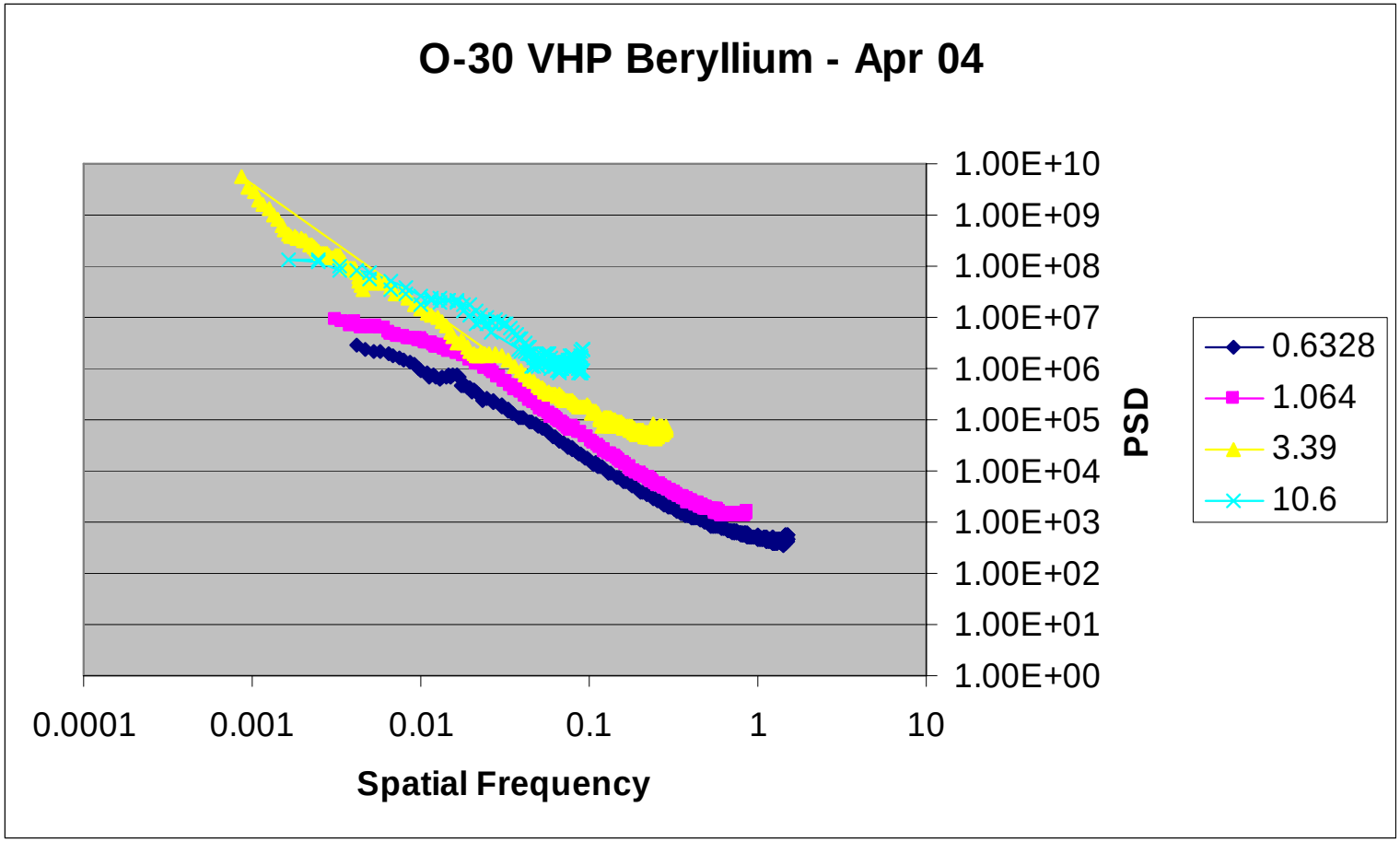
Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.460	0.554	0.943	0.960

O-30 VHP Beryllium

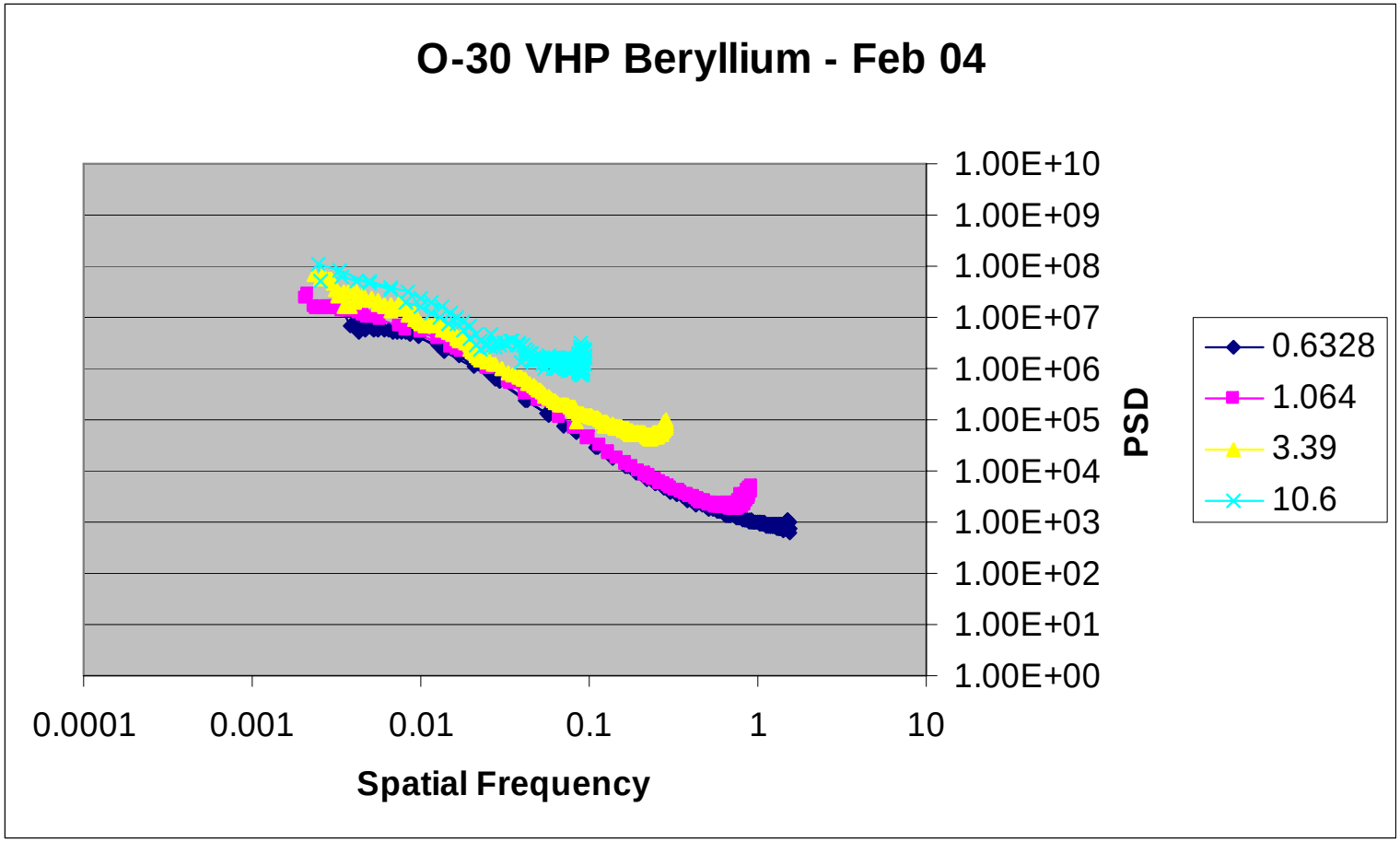


Surface Roughness

Ave RMS	Objective
1.28 nm	20X
0.38 nm	2.5X

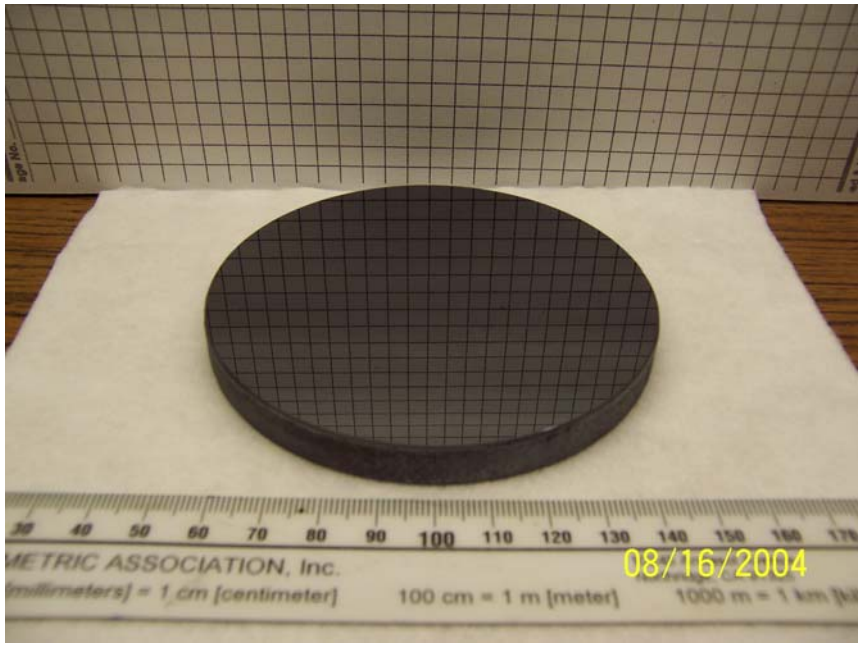


Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.458	0.567	0.957	0.993



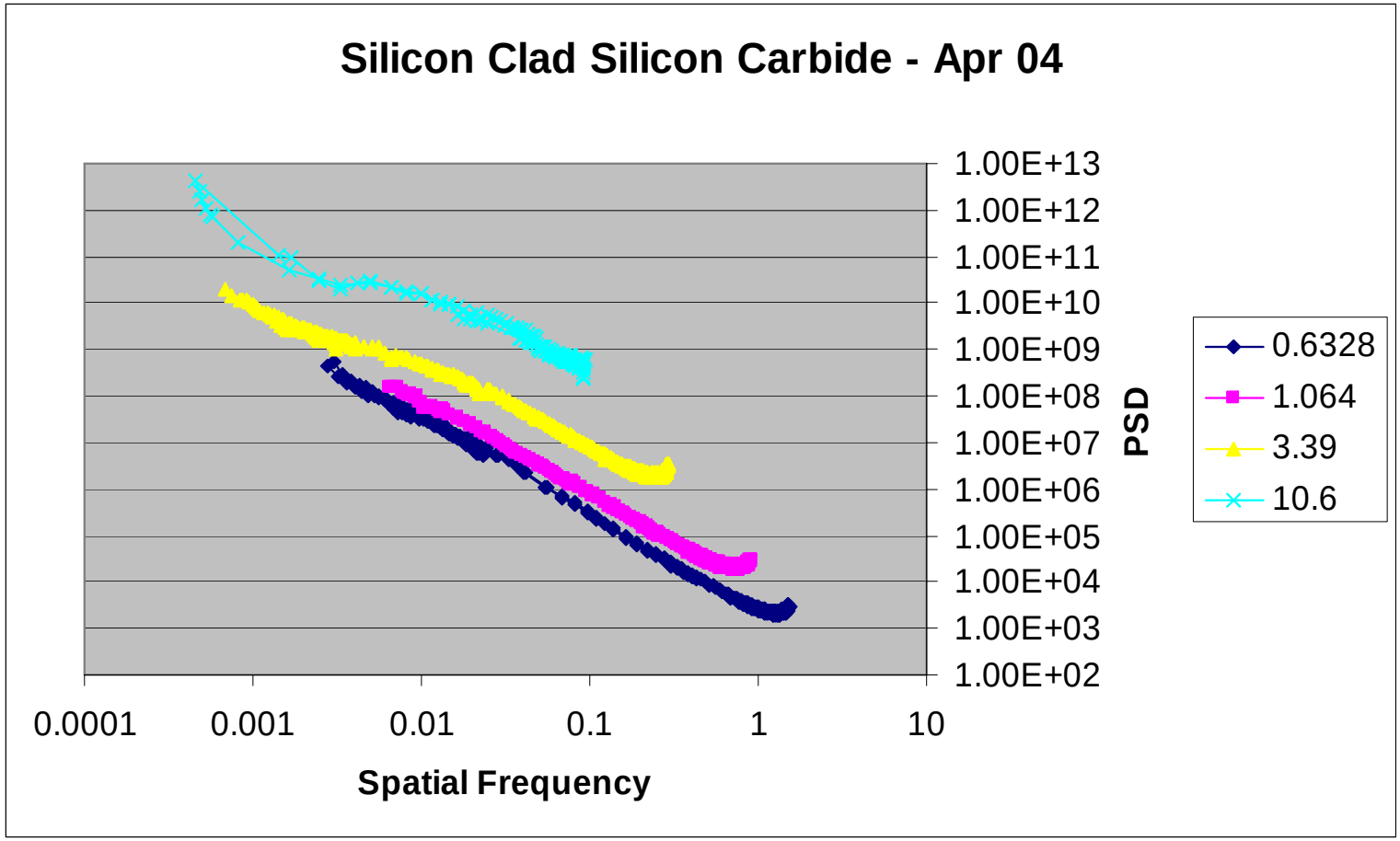
Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.458	0.555	0.890	0.839

Silicon Clad Silicon Carbide

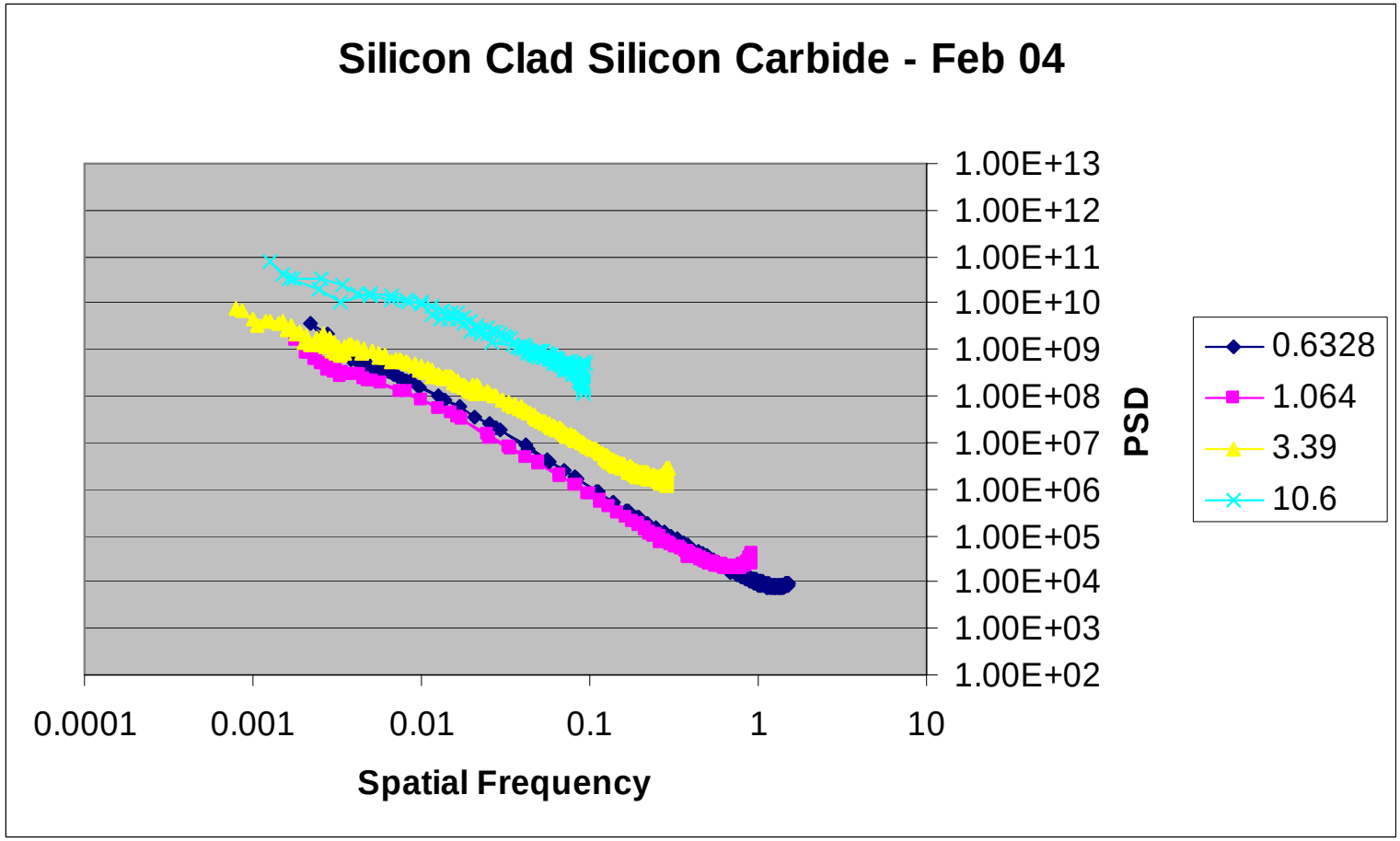


Surface Roughness

Ave RMS	Objective
1.42 nm	20X
0.56 nm	2.5X

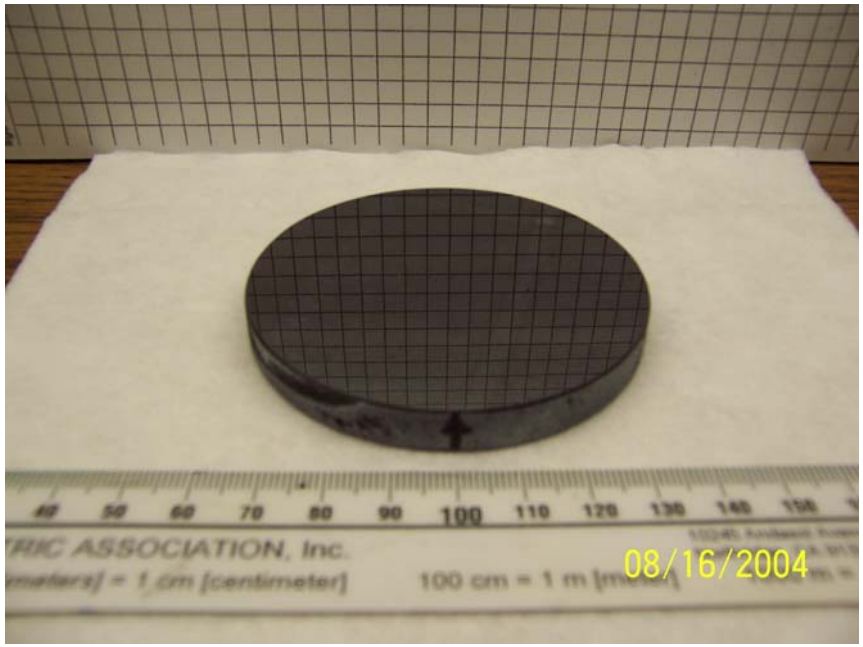


Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.222	0.217	0.209	0.442



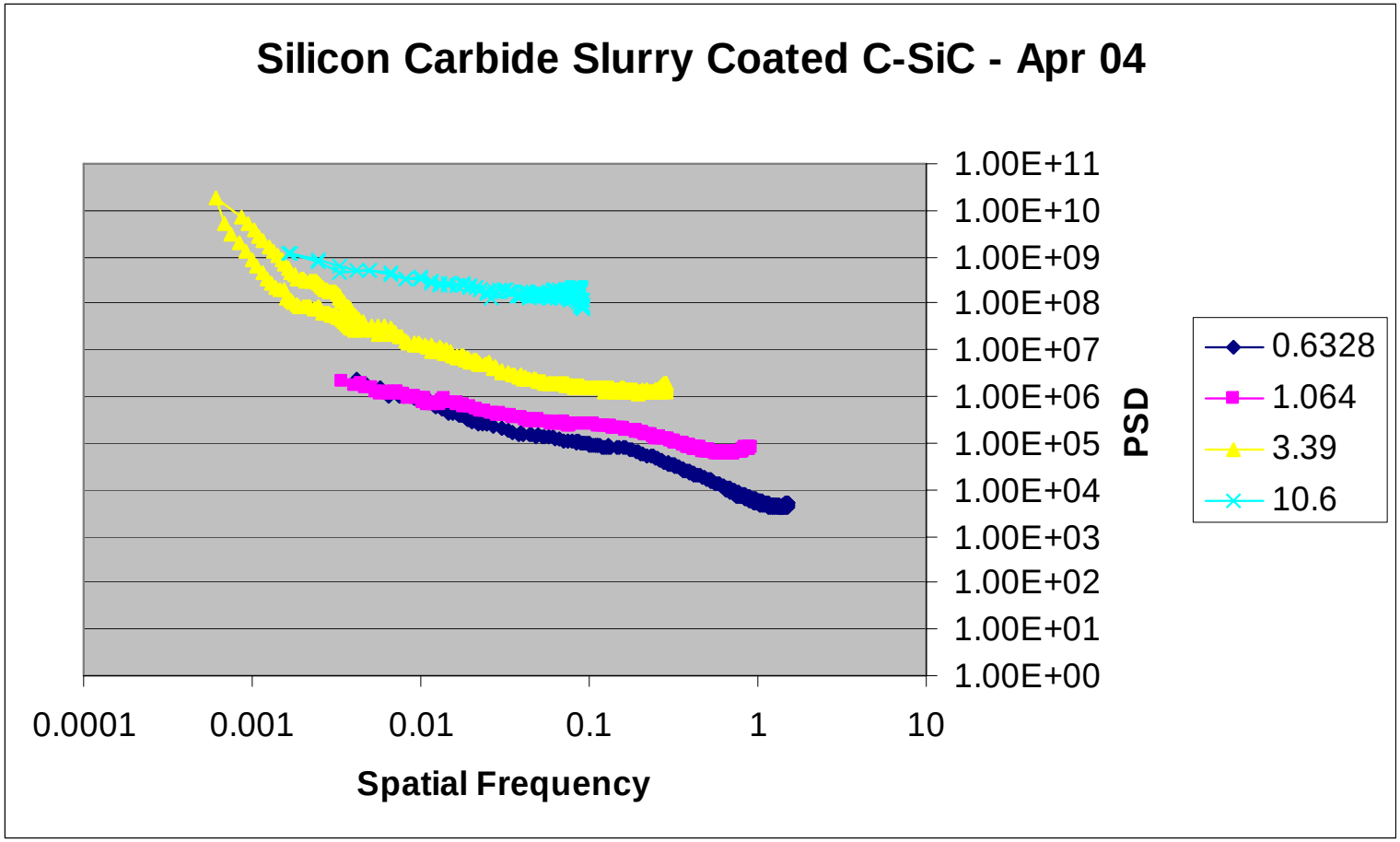
Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	(0.2)	0.213	0.210	0.467

SiC Slurry Coated Carbon-Silicon Carbide

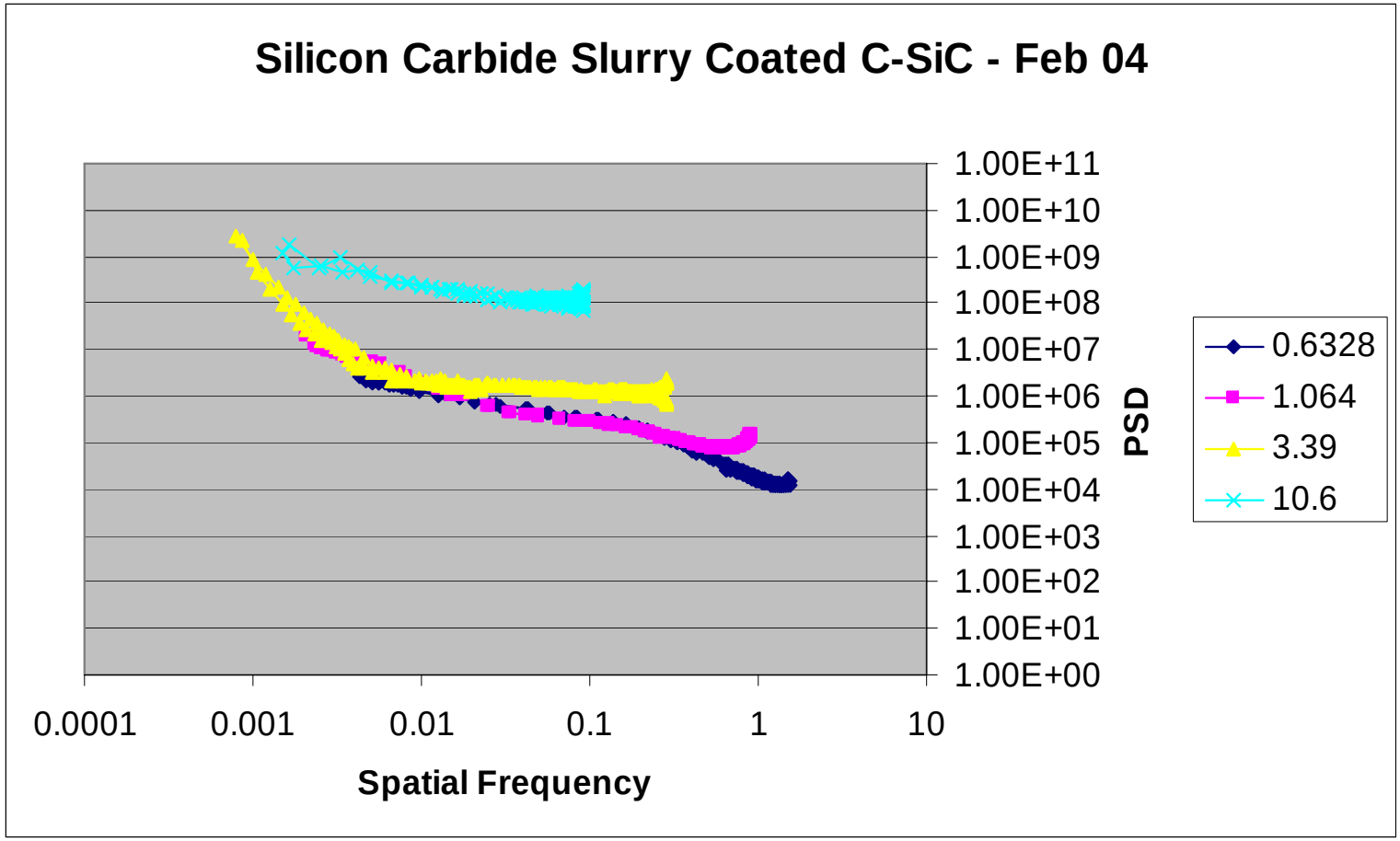


Surface Roughness

Ave RMS	Objective
13.1 nm	20X
11.9 nm	2.5X

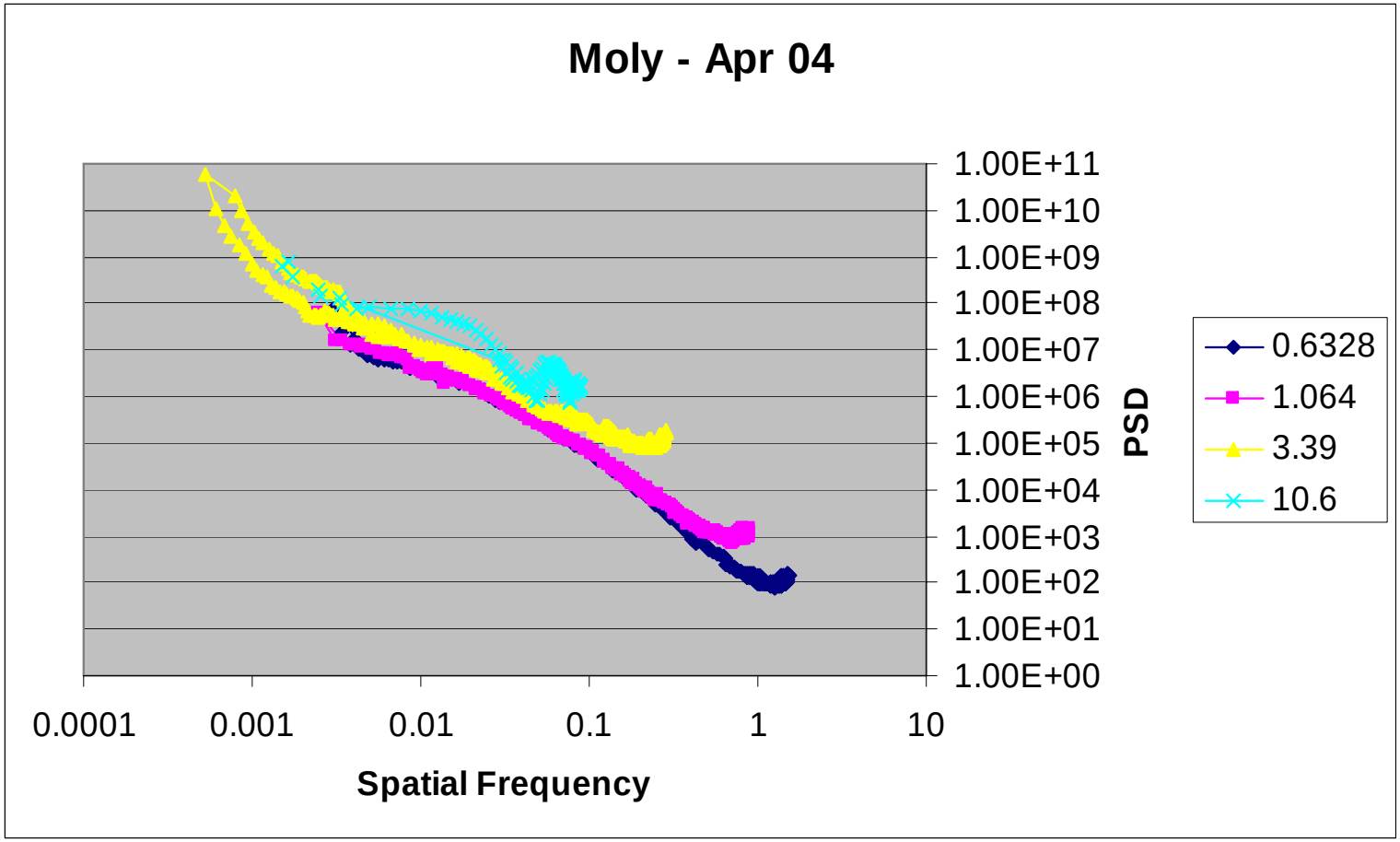


Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.217	0.243	0.215	0.459



Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	(0.2)	0.238	0.206	0.475

Moly



Wavelength	0.6328	1.064	3.39	10.6
Reflectivity	0.575	0.693	0.917	1.241