Aerogel

8/1/13

SP-20

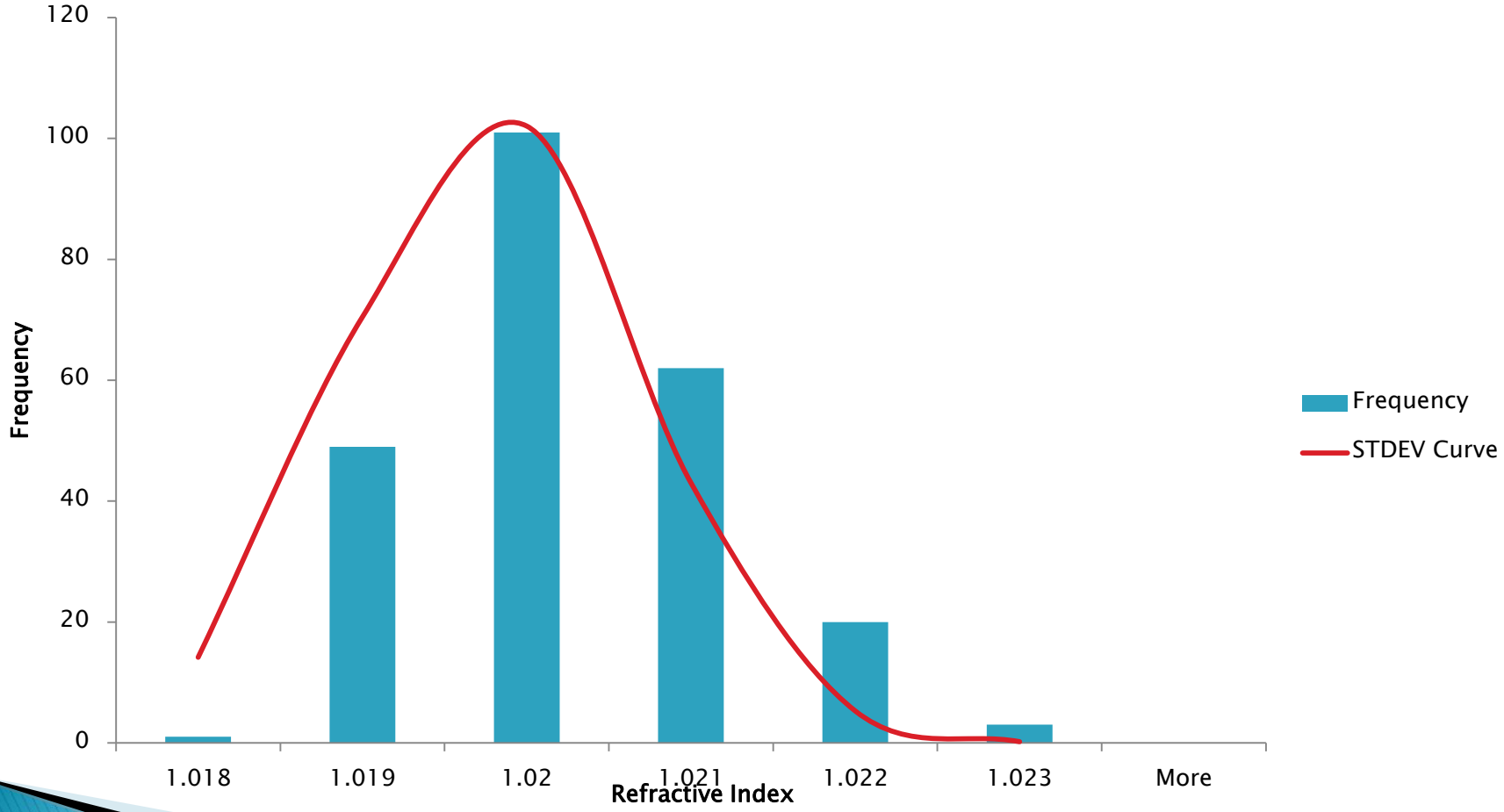
- All of the SP-20's have been measured with very few outliers
- The graph can be seen on the upcoming slide

SP-20 Refractive Index

Mean 1.02

STDEV .0009

Tiles 236



Experimental Uncertainty

- Hasn't been added to the graphs yet, but has been calculated
- Calculating Uncertainty
  - Refraction(D): measured 1 tile 10 times
  - Distance between the tile and wall (L) : +/- 3.175 mm, an uncertainty that had been previously defined
  - Incident angle(Alpha): +/- .5 degrees, half of the smallest unit of measurement

Mathematical Uncertainty

- As Marco suggested last week we found how much each variable affects the refractive index
- We added and subtracted two percent two each variable and compared the results to the original
- We found that D affected the refractive index the most, followed by L and the angle of the tile's corner

Experimental Uncertainty

- Finding the experimental uncertainty:
  - We found the uncertainty of each variable for the refractive index
  - We found the standard deviation of our measurments
  - Adding or subtracting the standard deviation to the average measurement of each variable we used each of the variables in every combination to find the refractive index
  - Chart is shown on next slide

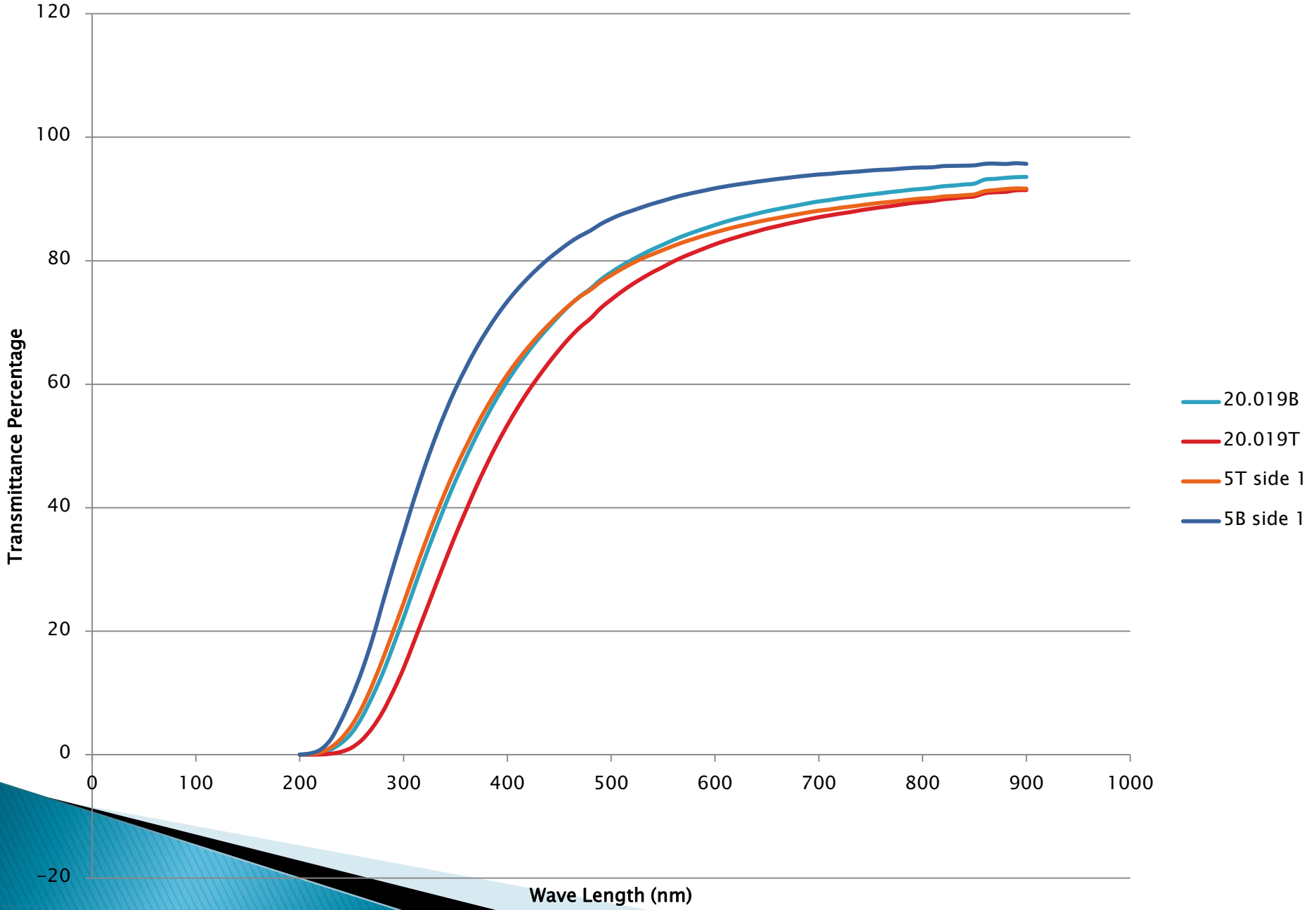
Experimental Uncertainty

Combinations	Refraction	Length	Incident Angle	Refractive Index
1	47.66	1146.969	45.5	1.208
2	47.66	1146.969	44.5	1.208
3	47.66	1140.62	45.5	1.021
4	47.66	1140.62	44.5	1.0209
5	47.34	1146.969	45.5	1.0207
6	47.34	1146.969	44.5	1.0207
7	47.34	1140.62	45.5	1.0208
8	47.34	1140.62	44.5	1.0208

Transmittance

- We ran transmittance tests on SP-20 and SP-30 tiles
- Although the SP-30's are denser, the SP-20 are generally much more cloudy and therefore have a lower transmittance
- In the graph it can be seen that when a SP-30 is both cloudy and more dense, though, it drops below some of the SP-20's

Transmittance Comparison



Humidity

- Humidity tests continue
- Found that by adding water to the bottom of the container the humidity would increase to the 90% range
- In the two tests we've run the refractive index still shows no significant change
- A corner broke when putting the last tile in, so we left it in the water and it too showed no significant change.