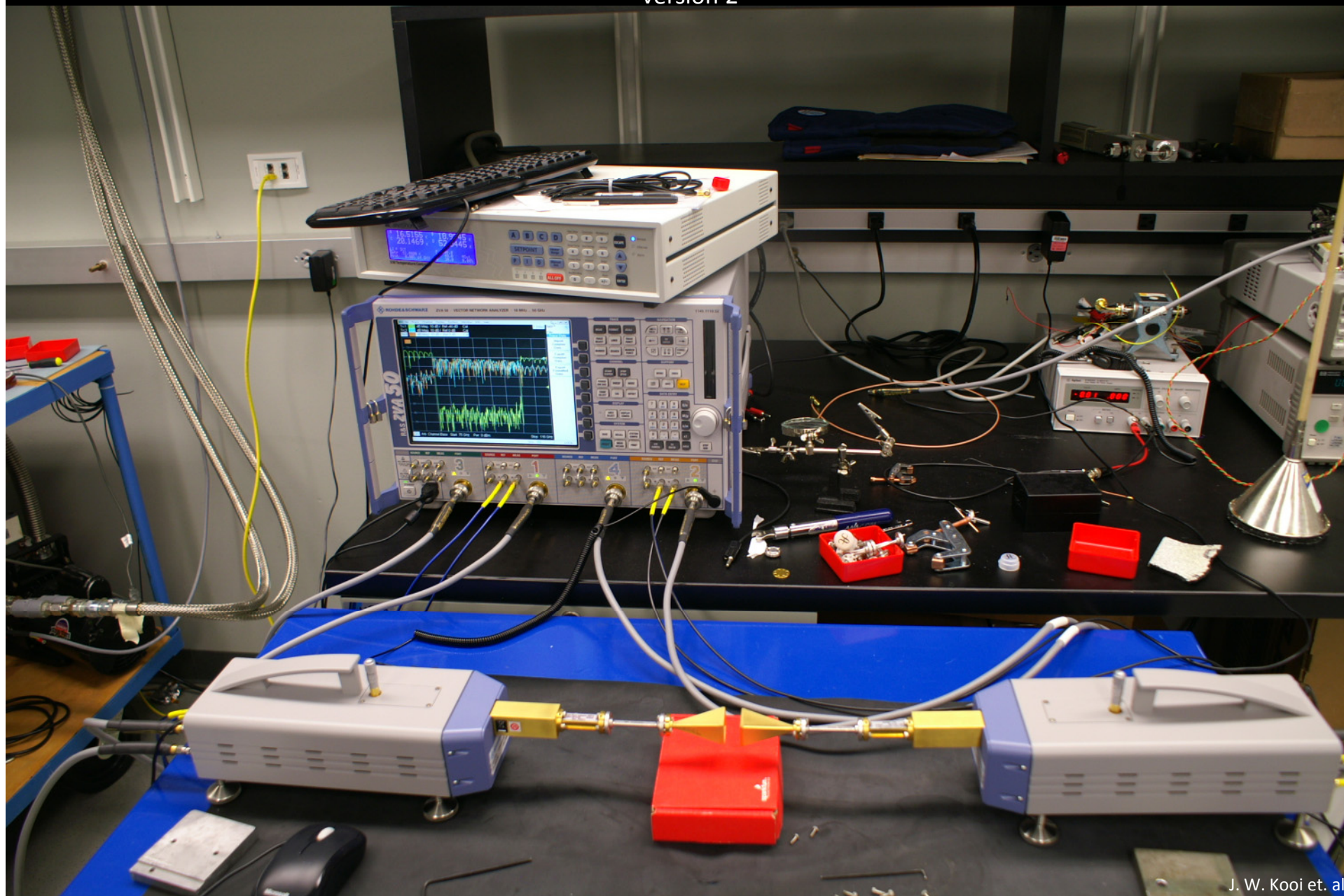


Stycast 2850 Load Measurements in Cahill Radio Lab (CRAL)

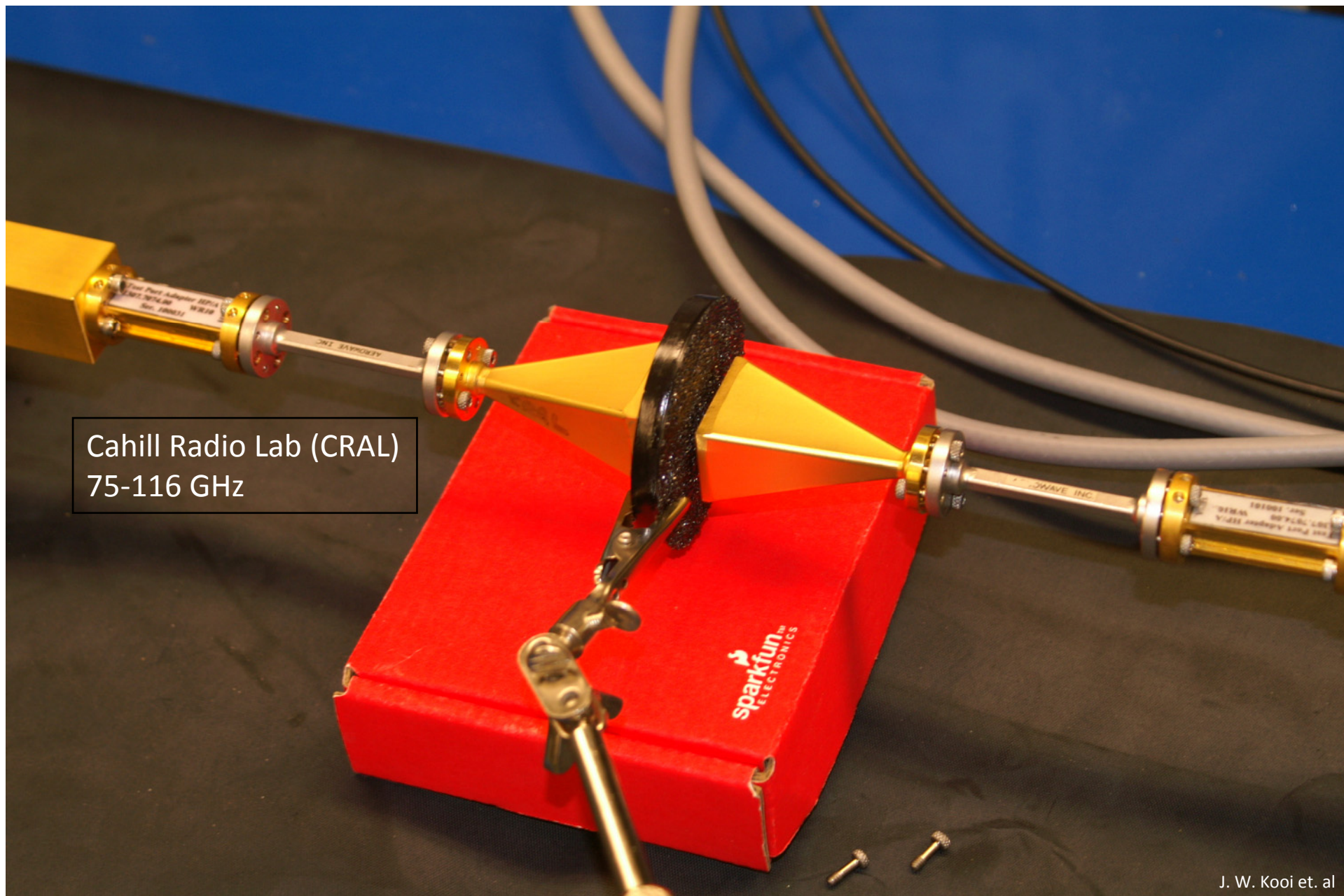
25 Jan 2012

version 2



Setup

One side of all samples was smooth walled, the other covered with SiC



Smooth side (S11)



Rough SiC side (S22)

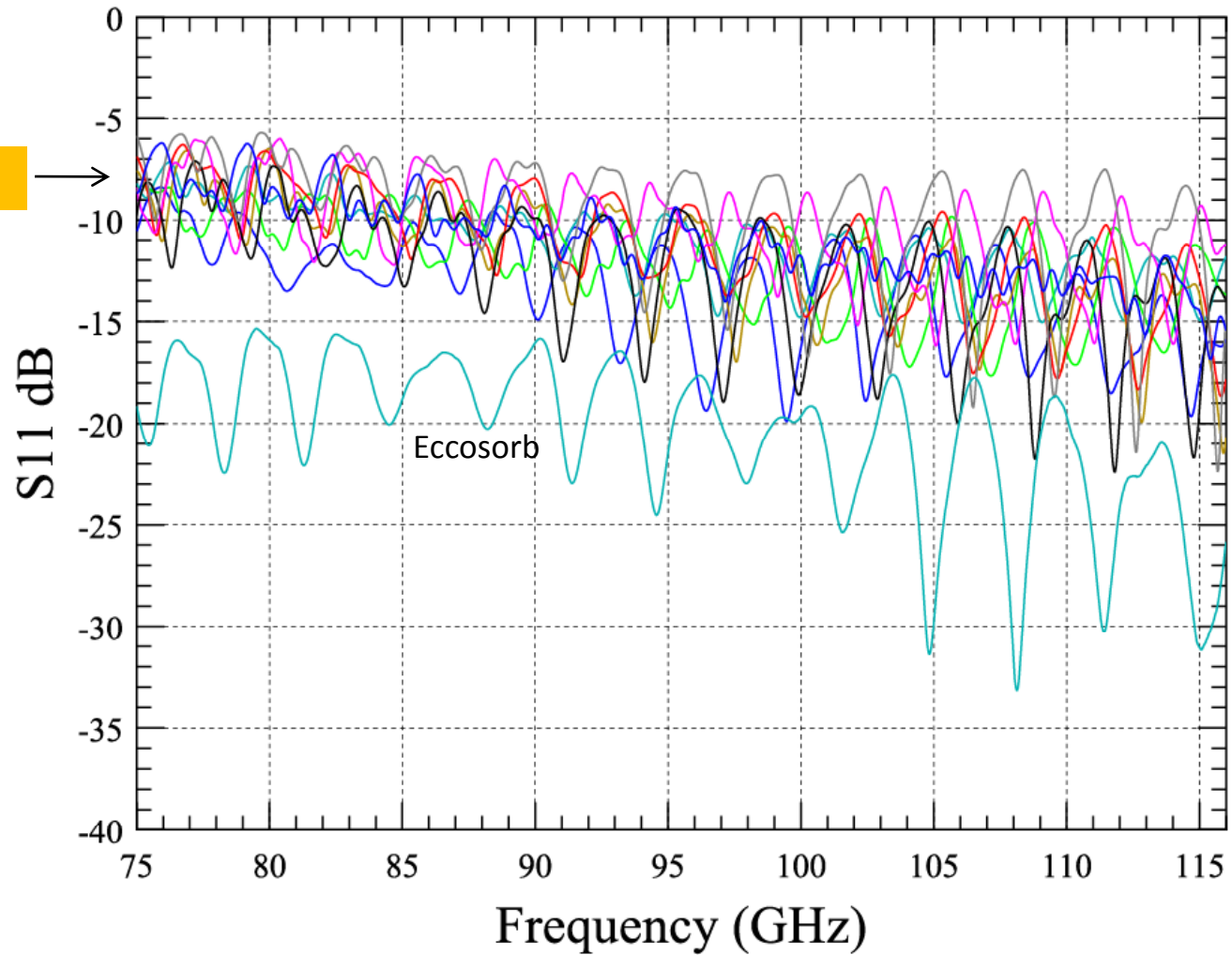


Sample Composition

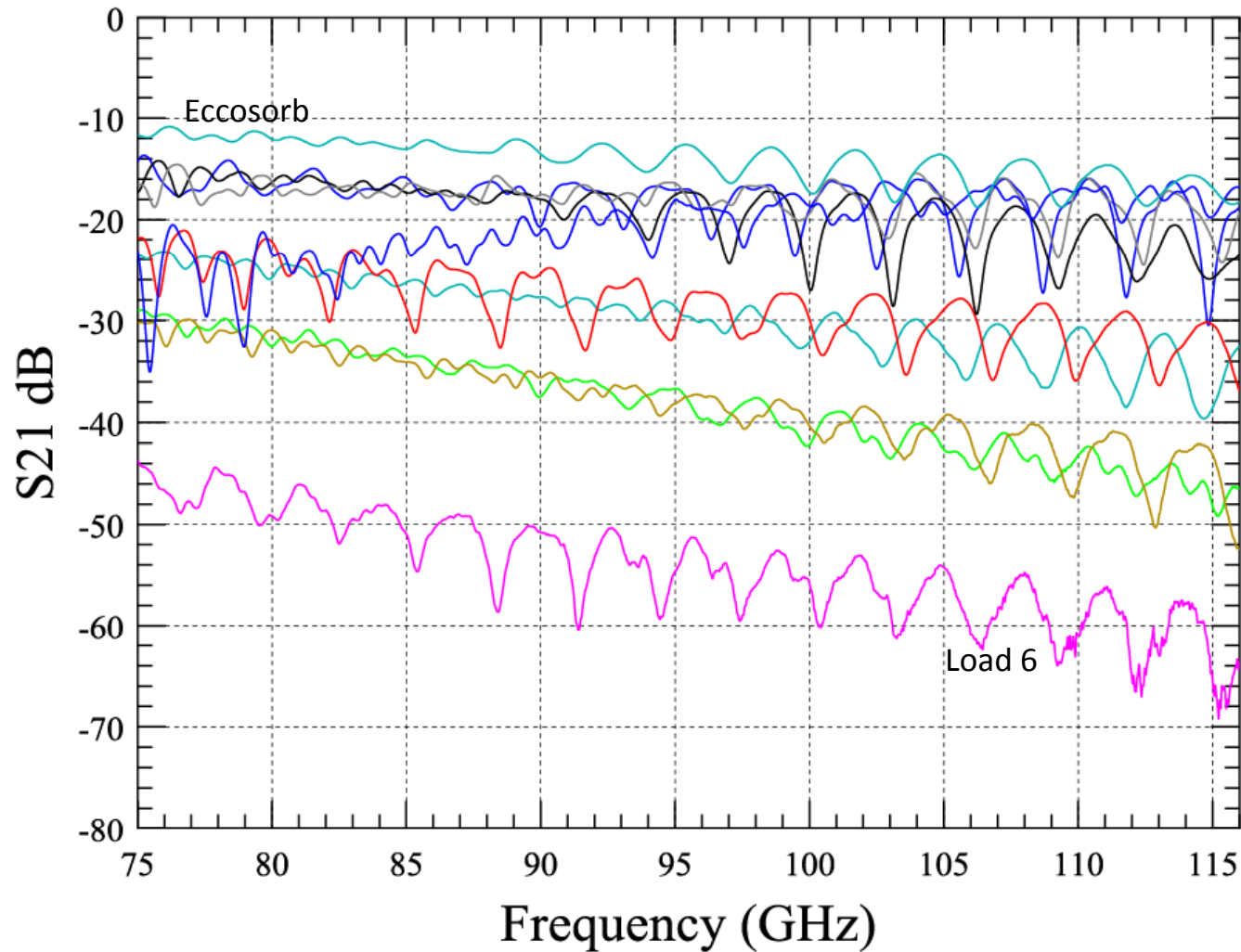
Sample	Stycast	Lampblack (%)	SS* (%)	Thickness (mm)	Comments
1	2850	0	0	6.40	Pure Stycat, SiC on one side
2	2850	5	0	5.80	SiC on one side 'Bock black'
3	2850	5	5	6.40	SiC on one side *Stainless Steel Powder 325 mesh
4	2850	5	10	6.45	SiC on one side *Stainless Steel Powder 325 mesh
5	2850	10	0	5.50	SiC on one side
6	2850	10	10	5.50	SiC on one side *Stainless Steel Powder 325 mesh
7	2850	7	20	6.55	SiC on one side *Carpenter "Micro Melt" 316L, 16 um
8	2850	7	20	2.70	SiC on one side *Carpenter "Micro Melt" 316L, 16 um
9	2850	7	20	2.70	SiC on one side *Stainless Steel Powder 325 mesh
10	AN-72 Eccosorb			6.35	Both sides rough

Corrected S11 (shiny side)

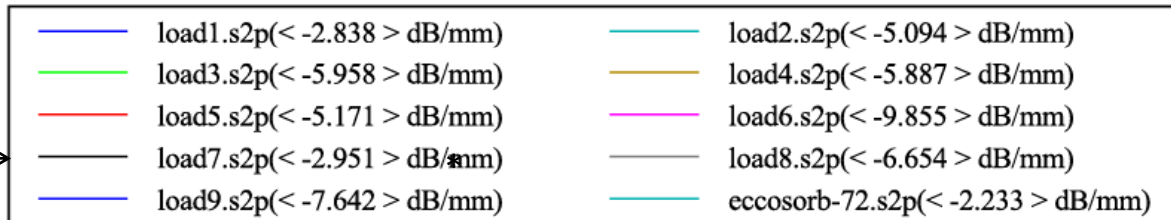
Surface too smooth



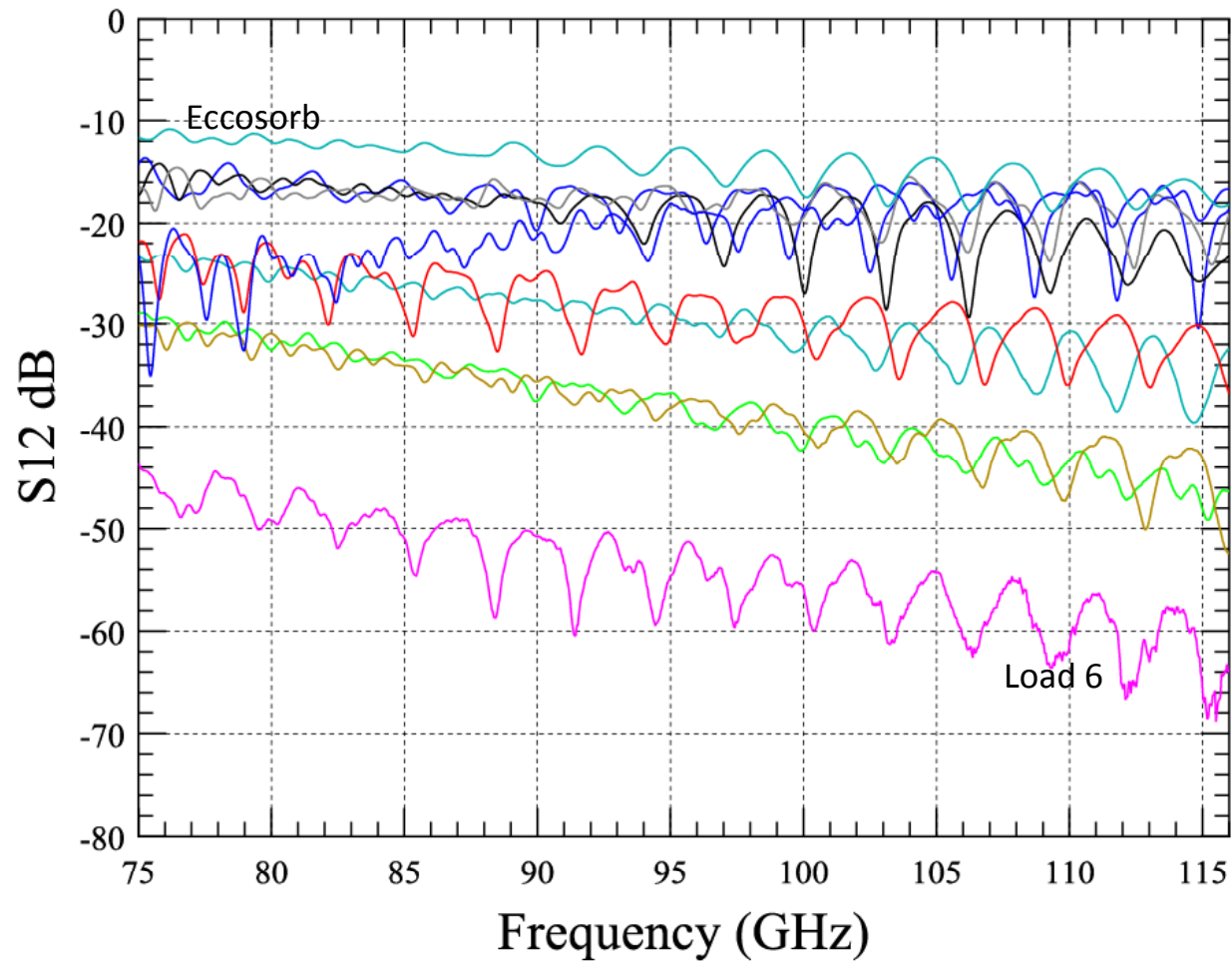
Corrected Through (S21) Loss



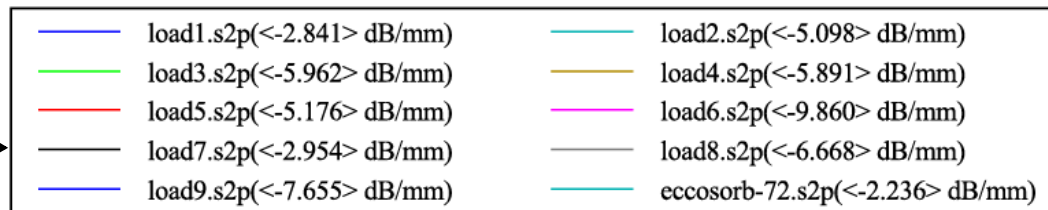
#7 Inhomogeneous mixture!! Be aware



Corrected 'Reverse' Through (S12) Loss

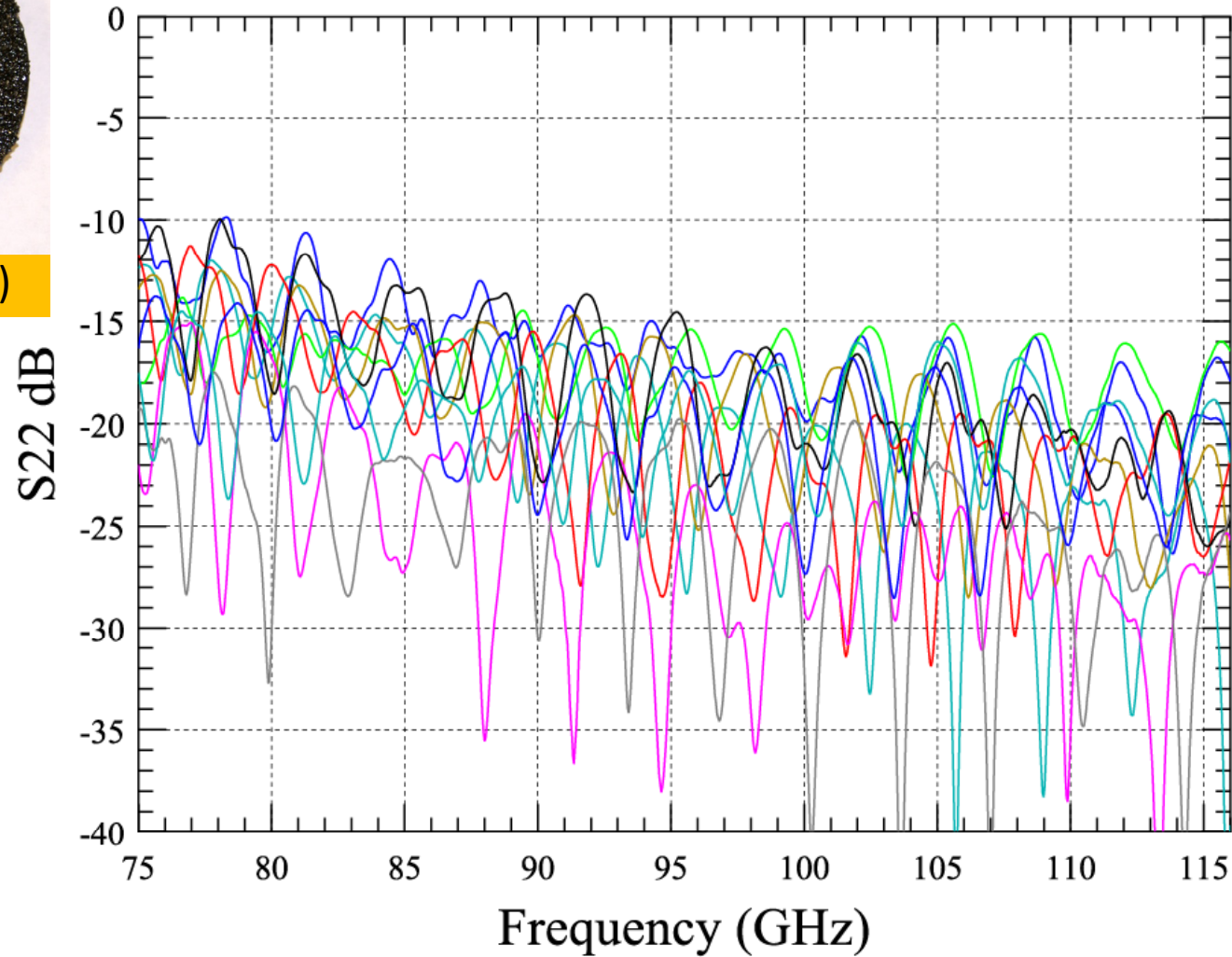


#7 Inhomogeneous mixture!! Be aware





Corrected S22 (SiC)



load1.s2p(< -19.71 > dB)	load2.s2p(< -24.14 > dB)
load3.s2p(< -20.45 > dB)	load4.s2p(< -22.29 > dB)
load5.s2p(< -23.33 > dB)	load6.s2p(< -28.62 > dB)
load7.s2p(< -21.18 > dB)	load8.s2p(< -27.82 > dB)
load9.s2p(< -22.79 > dB)	eccosorb-72.s2p(< -22.57 > dB)

Summary Absorber Properties

Sample	Stycast	Lampblack (%)	SS* (%)	Thickness (mm)	S11 (dB)	S21 (dB/mm)	S22 (dB)	Comments Values are mean <75-116 GHz>
1	2850	0	0	6.40	- 16.4	-2.8	- 19.7	Pure Stycast 2850
2	2850	5	0	5.80	-14.0	- 5.1	- 24.1	'Bock black'
3	2850	5	5	6.40	-15.0	- 6.0	- 20.5	*Stainless Steel Powder 325 mesh
4	2850	5	10	6.45	-14.8	- 5.9	- 22.3	*Stainless Steel Powder 325 mesh
5	2850	10	0	5.50	-14.2	- 5.2	- 23.3	No SS
6	2850	10	10	5.50	- 13.3	- 9.8	-28.6	*Stainless Steel Powder 325 mesh
7	2850	7	20	6.55	-15.5	- 2.95	- 21.2	*Carpenter "Micro Melt" 316L, 16 um (anomalous, poor mixing, e.g. pure Stycast = sample 1)
8	2850	7	20	2.70	- 12.8	-6.7	- 27.8	*Carpenter "Micro Melt" 316L, 16 um
9	2850	7	20	2.70	-14.0	- 7.64	- 22.8	*Stainless Steel Powder 325 mesh
10	AN-72 Eccosorb			6.35	- 23.5	-2.2	- 22.6	Both sides rough

Summary Notes

- Homogenous mixing is very important, which given the consistency of the material is non trivial.
- Roughen surface to minimize reflection. The Stycast samples are not particularly well matched to free space (slide 5). Adding different amounts of ss powder does not appears to appreciably change this.
- For AN-72, make sure thickness is adequate
- Sample 6 clearly has the largest absorption, however it's constancy is like 'putty'.

Note: Future analyses may be extend to include a derived complex dielectric constant ($\epsilon = \epsilon' + i\epsilon''$), thereby providing information on the material dielectric constant and loss tangent. It may also be worthwhile to measure the samples in the submm.