

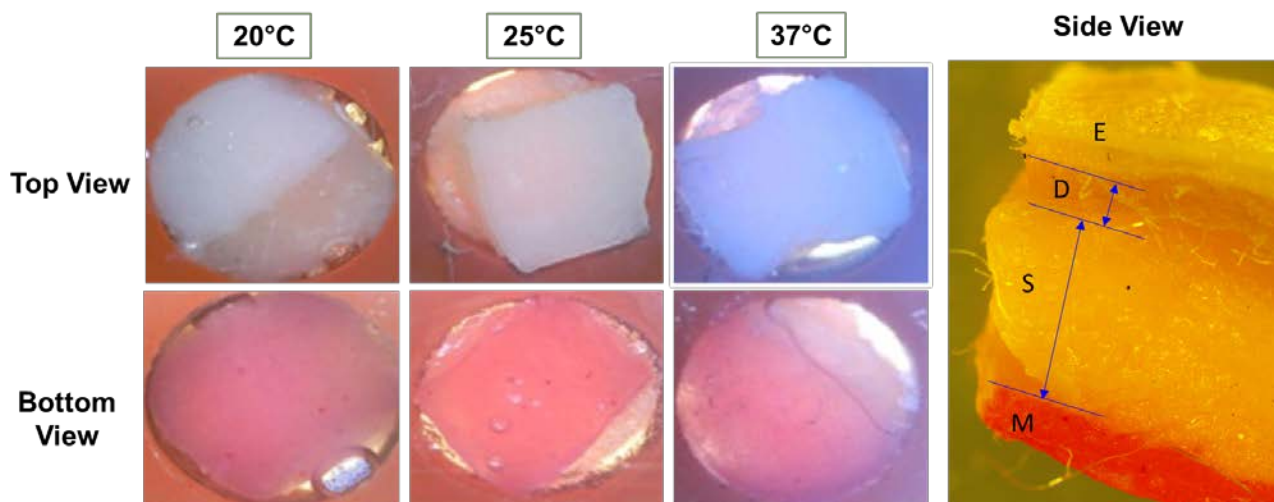
**Supporting Information for “Microwave Heating of Synthetic Skin for Potential Treatment of Gout using the Metal-Assisted and Microwave-Accelerated Decrystallization Technique”**

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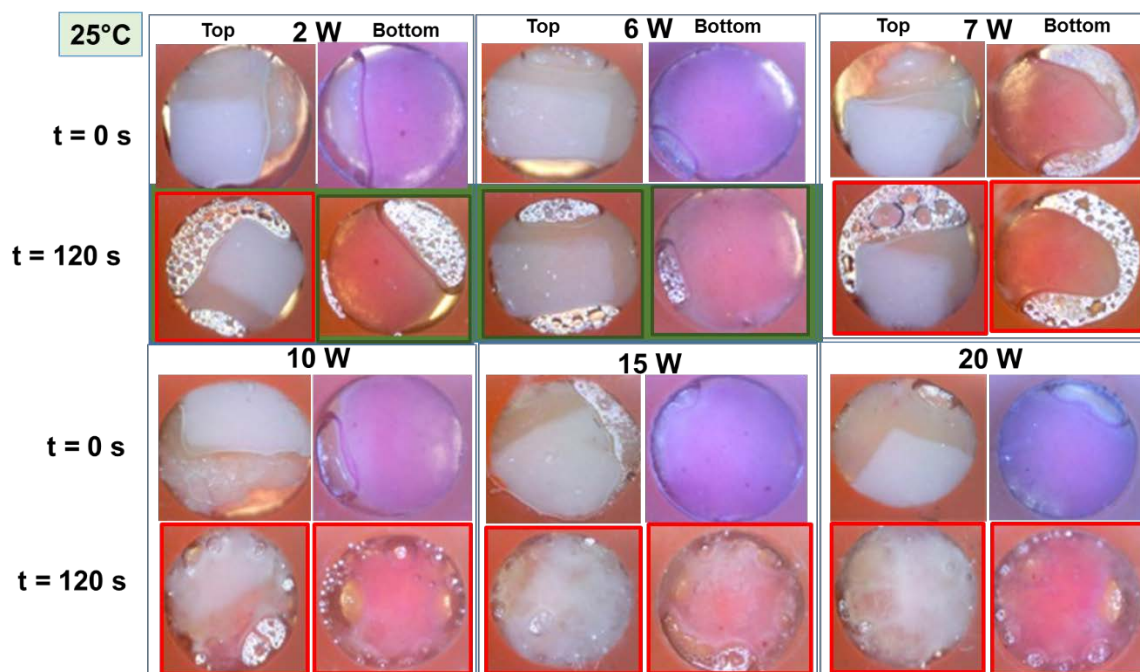
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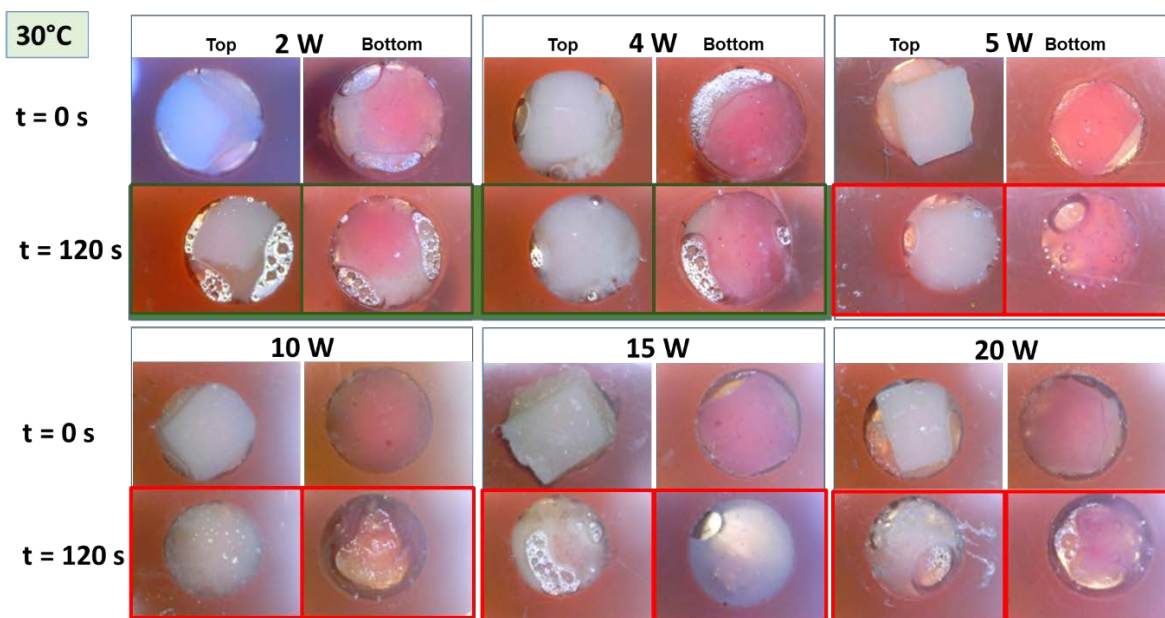
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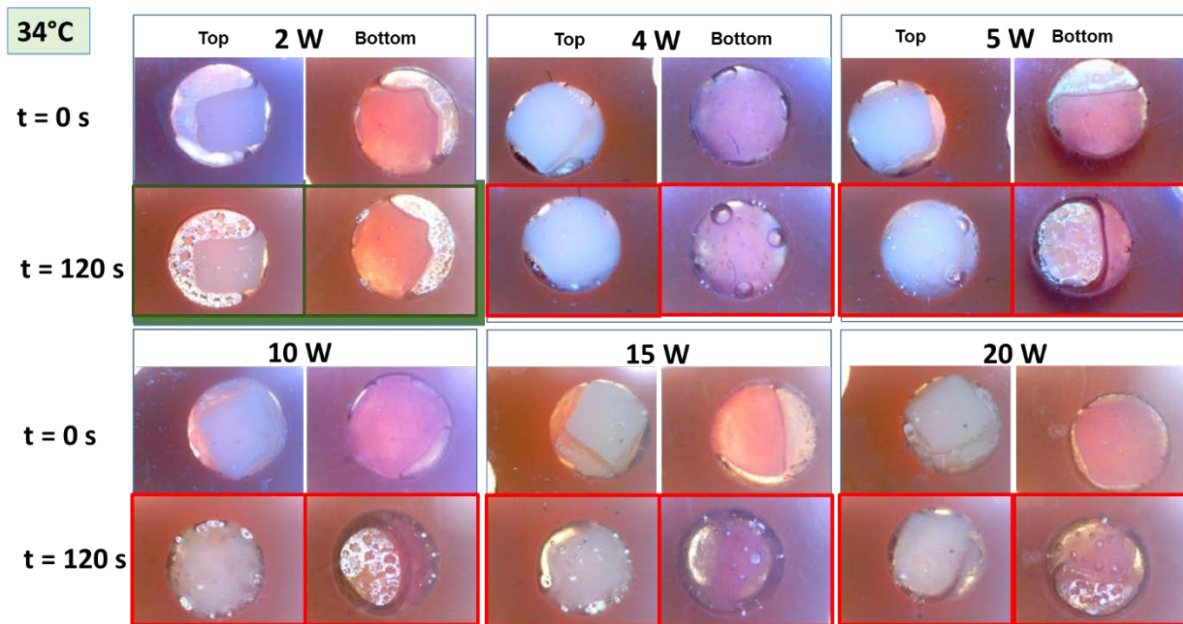
**Figure S1.** Synthetic skin control samples prior to their exposure to 8 GHz medical microwaves at 20°C, 25°C and 37°C. The upper view represents the top of well and lower view represents the bottom of the well. Side view of synthetic skin construct taken with a stereomicroscope, which shows the individual layers of the skin construct.



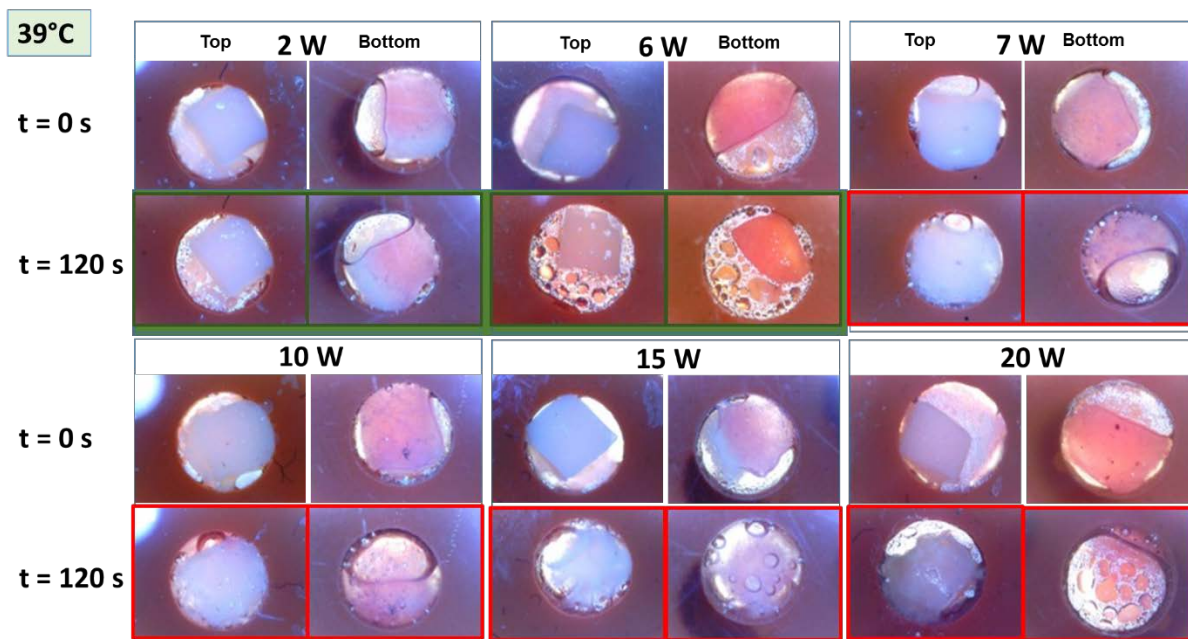
**Figure S2. Qualitative assessment of skin damage via visual confirmation.** Real-color pictures of synthetic skin samples below room temperature (assessed up to 120 s at 25°C initial temperature at t = 0 s) before and during microwave heating at 2 W, 4 W, 5 W, 10 W, 15 W and 20 W. Green frames denotes no tissue damage at 2 W and 4 W. Red frames denote tissue damage after 120 s of microwave heating at 5 W, 10 W, 15 W and 20 W.



**Figure S3. Qualitative assessment of skin damage via visual confirmation.** Real-color pictures of synthetic skin samples below room temperature (assessed up to 120 s at 30°C initial temperature at t = 0 s) before and during microwave heating at 2 W, 4 W, 5 W, 10 W, 15 W and 20 W. Green frames denotes no tissue damage at 2 W and 4 W. Red frames denote tissue damage after 120 s of microwave heating at 5 W, 10 W, 15 W and 20 W.



**Figure S4. Qualitative assessment of skin damage via visual confirmation.** Real-color pictures of synthetic skin samples below room temperature (assessed up to 120 s at 34°C initial temperature at  $t = 0$  s) before and during microwave heating at 2 W, 4 W, 5 W, 10 W, 15 W and 20 W. Green frames denotes no tissue damage at 2 W and 4 W. Red frames denote tissue damage after 120 seconds of microwave heating at 5 W, 10 W, 15 W and 20 W.



**Figure S5. Qualitative assessment of skin damage via visual confirmation.** Real-color pictures of synthetic skin samples below room temperature (assessed up to 120 seconds at 34°C initial temperature at  $t = 0$  sec) before and during microwave heating at 2 W, 4 W, 5 W, 10 W, 15 W and 20 W. Green frames denotes no tissue damage at 2 W and 4 W. Red frames denote tissue damage after 120 seconds of microwave heating at 5 W, 10 W, 15W and 20 W.



Synthetic skin samples ,  $T_i = 20^\circ\text{C}$

Microwave Heating Time	Microwave Power													
	2 W		3 W		4 W		5 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s														
20 s														
40 s														
60 s														
80 s														
100 s														
120 s														

**Figure S6.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $20^\circ\text{C}$ .

Synthetic skin samples ,  $T_i = 25^\circ\text{C}$

Microwave Heating Time	Microwave Power																	
	2 W		5 W		6 W		7W		8 W		9 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s																		
20 s																		
40 s																		
60 s																		
80 s																		
100 s																		
120 s																		

**Figure S7.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $25^\circ\text{C}$ .

### Synthetic skin samples , $T_i = 30^\circ\text{C}$

Microwave Heating Time	Microwave Power													
	2 W		3 W		4 W		5 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s														
20 s														
40 s														
60 s														
80 s														
100 s														
120 s														

**Figure S8.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $30^\circ\text{C}$

### Synthetic skin samples , $T_i = 34^\circ\text{C}$

Microwave Heating Time	Microwave Power													
	2 W		3 W		4 W		5 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s														
20 s														
40 s														
60 s														
80 s														
100 s														
120 s														

**Figure S9.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $34^\circ\text{C}$



Synthetic skin samples ,  $T_i = 37^\circ\text{C}$

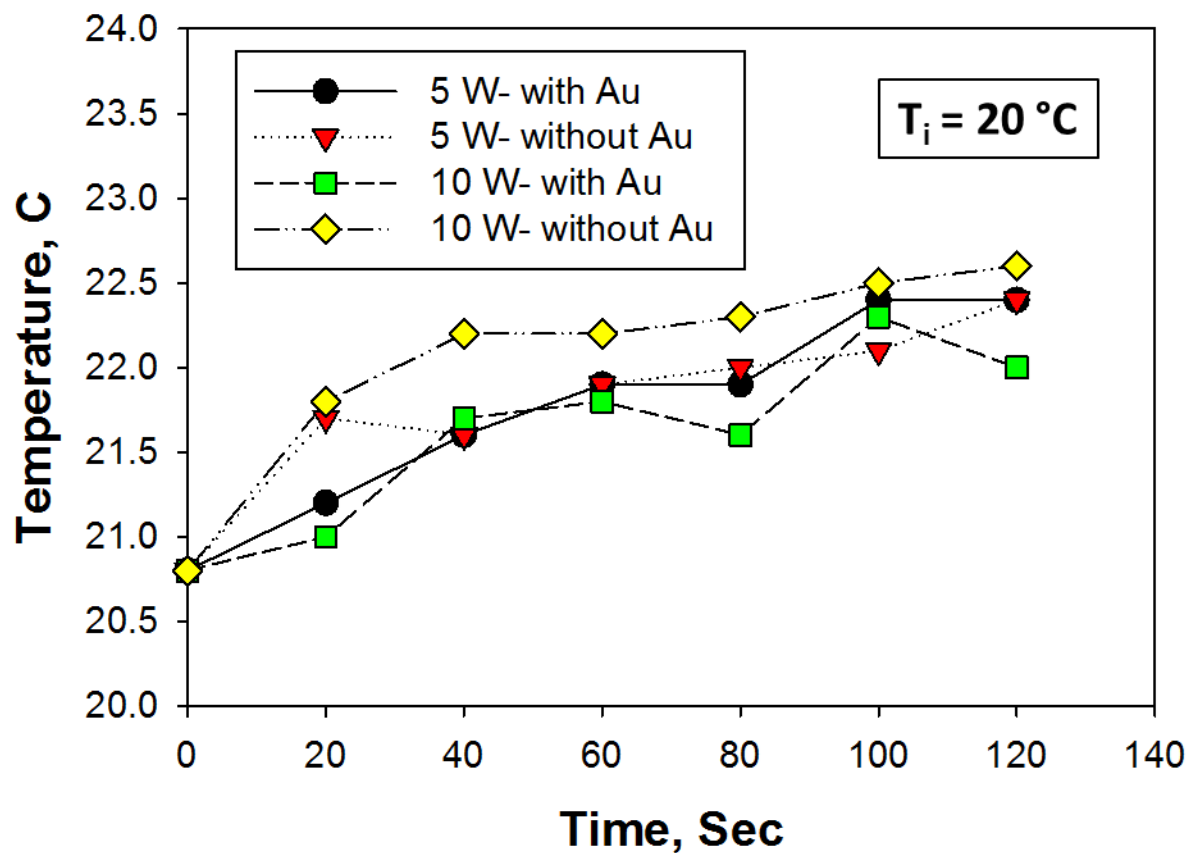
Microwave Heating Time	Microwave Power													
	2 W		3 W		4 W		5 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s														
20 s														
40 s														
60 s														
80 s														
100 s														
120 s														

**Figure S10.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $37^\circ\text{C}$ .

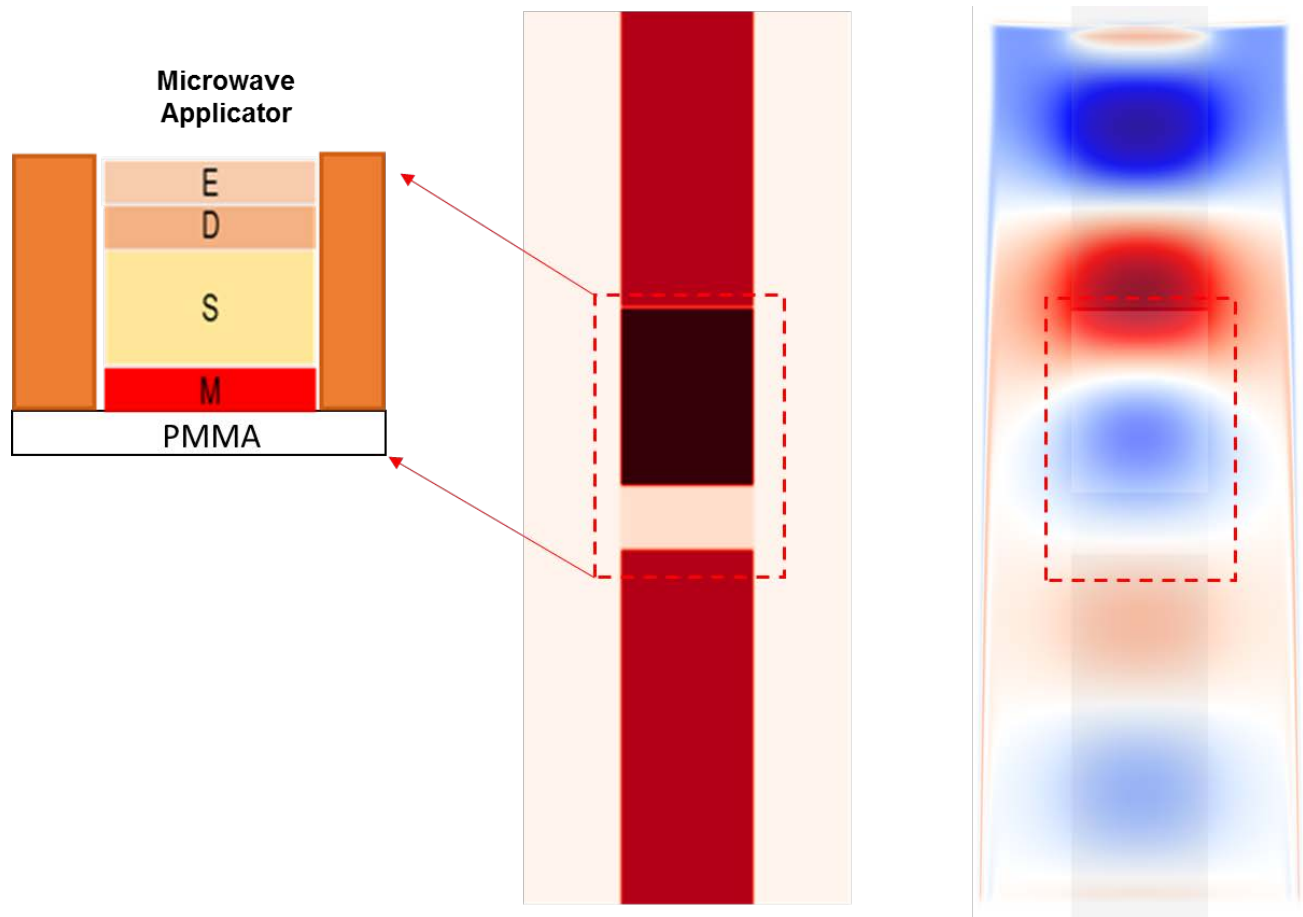
Synthetic skin samples ,  $T_i = 39^\circ\text{C}$

Microwave Heating Time	Microwave Power																	
	2 W		5 W		6 W		7W		8 W		9 W		10 W		15 W		20 W	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
0 s																		
20 s																		
40 s																		
60 s																		
80 s																		
100 s																		
120 s																		

**Figure S11.** Synthetic skin samples during exposure to 8 GHz medical microwaves at  $39^\circ\text{C}$ .



**Figure S12. Quantitative assessment of temperature change in skin only and skin with AuNPs (*In vitro*).** Inclusion of gold nanoparticles within synthetic skin samples results in lower temperature increase as compared to synthetic skin samples without gold nanoparticles.



**Figure S13.** Simulations of electric field distributions for a 8 GHz microwave source in a waveguide with synthetic skin samples placed on between a cover slip and iCrystal plates.