

# How Bicomponent Technology Works and What it Offers

**Jeff Dugan**

**Fiber Innovation Technology, Inc.**

November 8, 2019





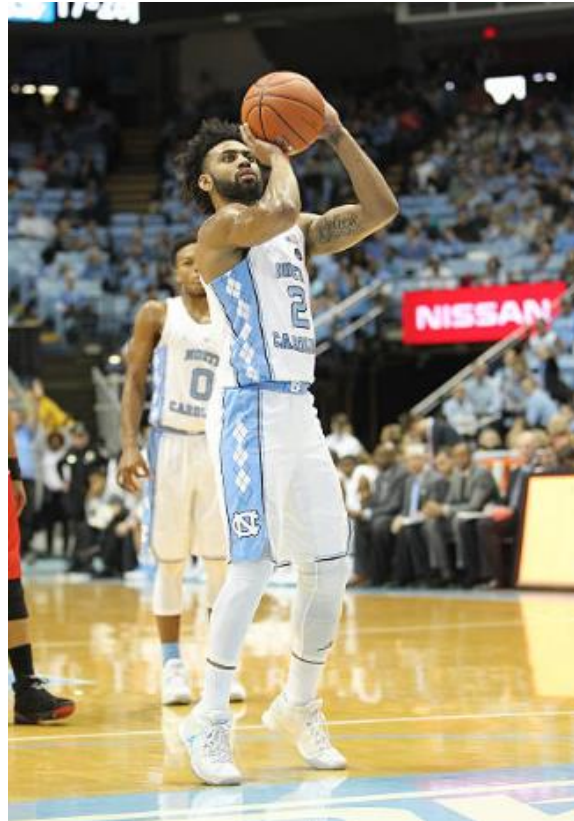
Which is better: one or two?



Which is better: one or two?



Which is better: one or two?

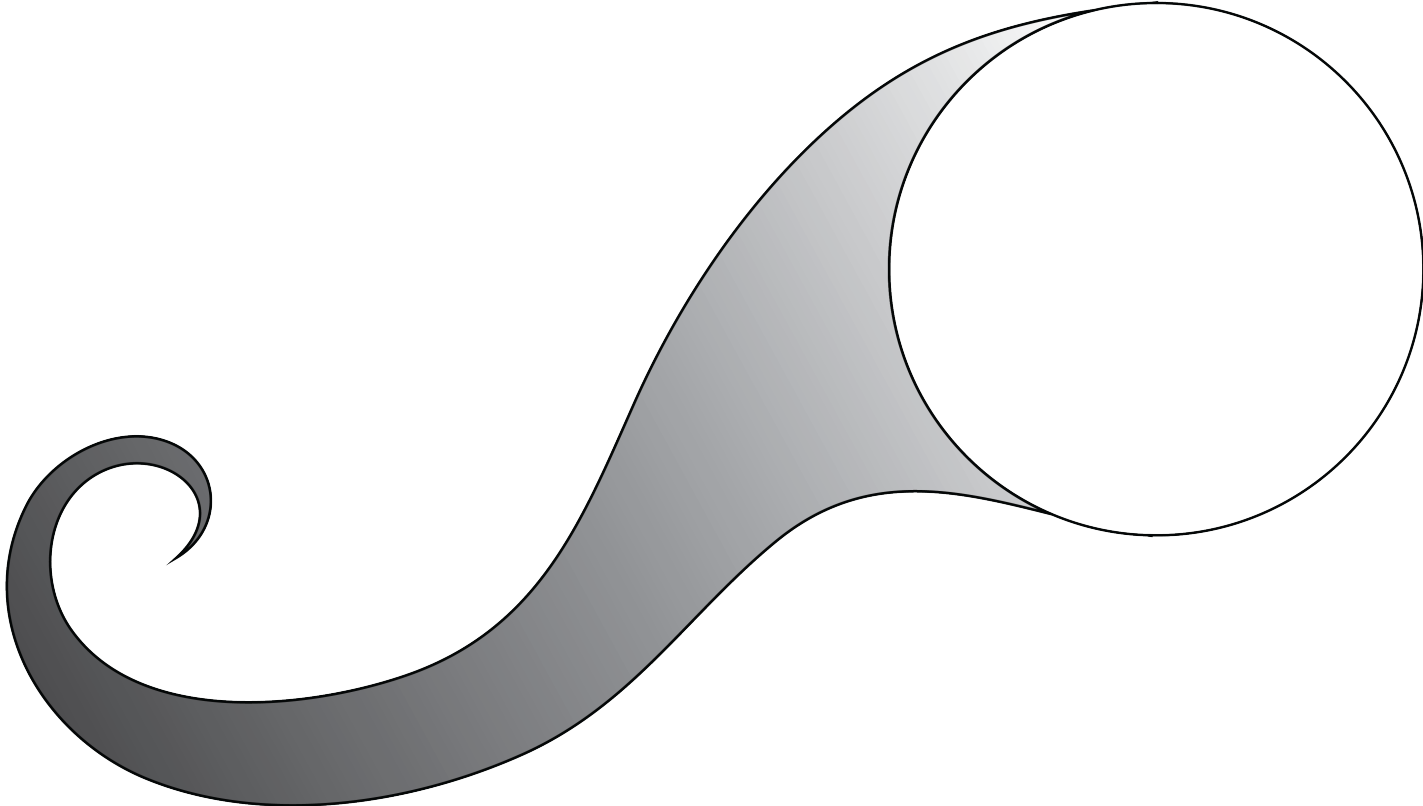


Sometimes, one is better than two...

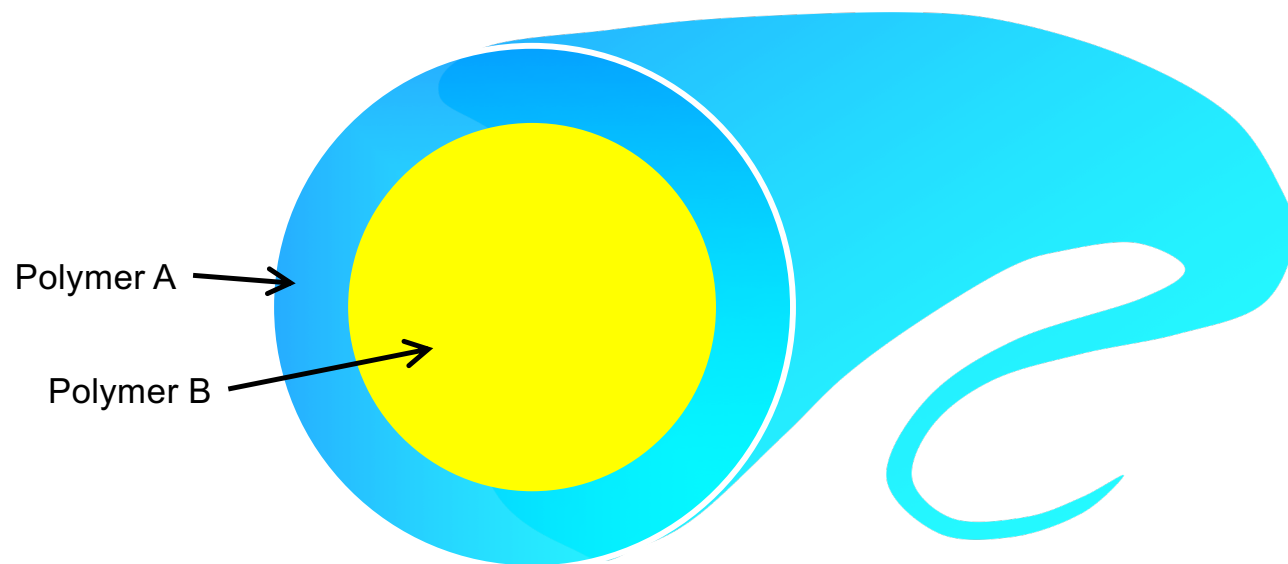
Which is better: one or two?

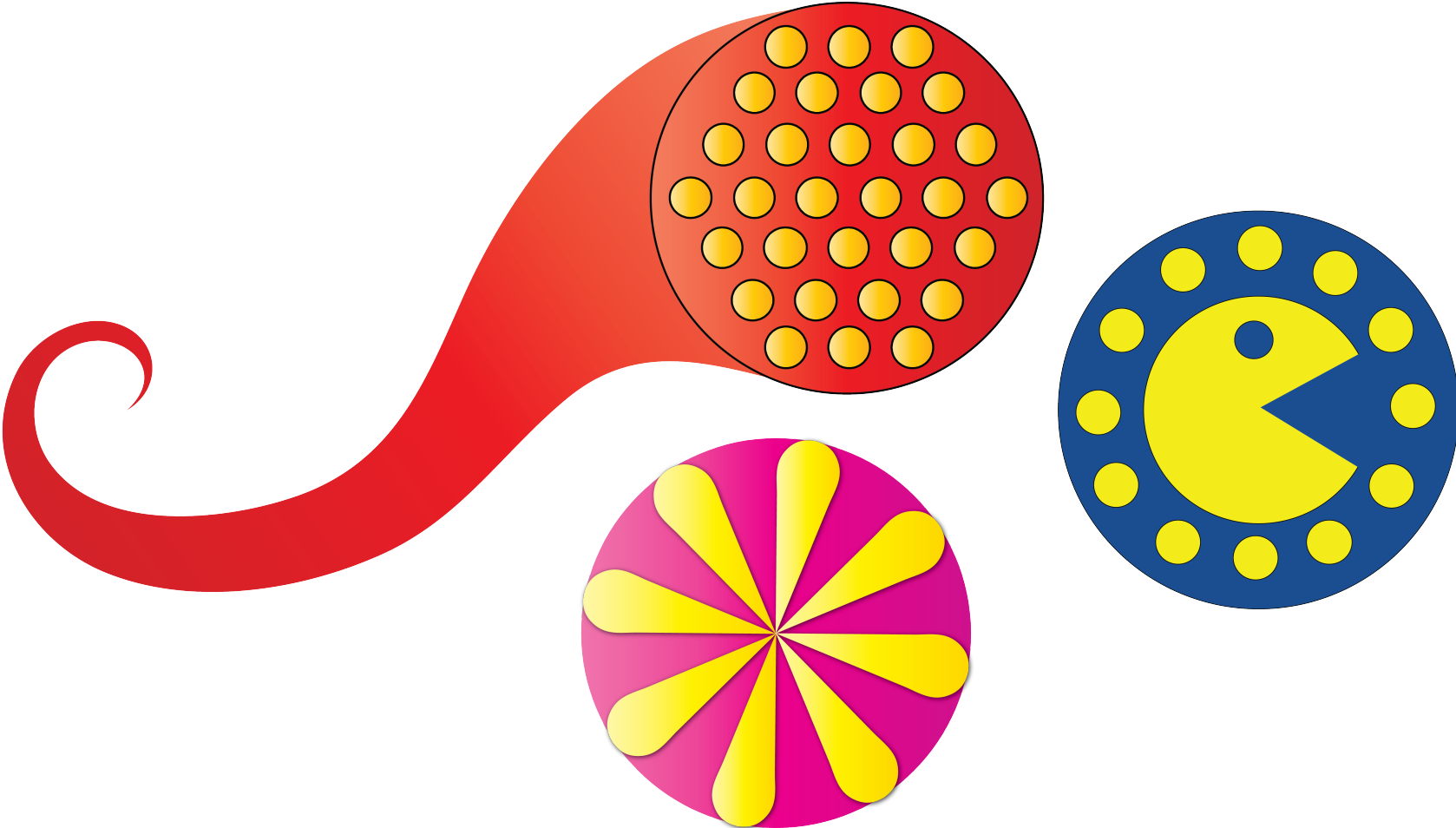


...but generally, two are better than one.

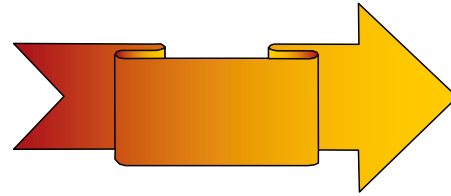
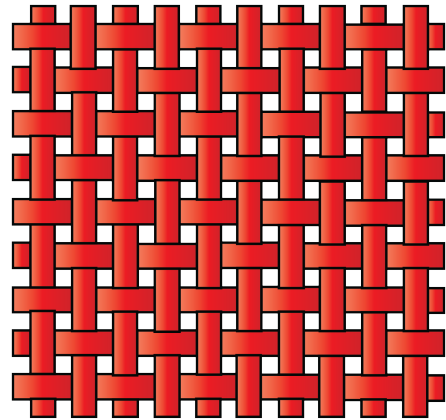
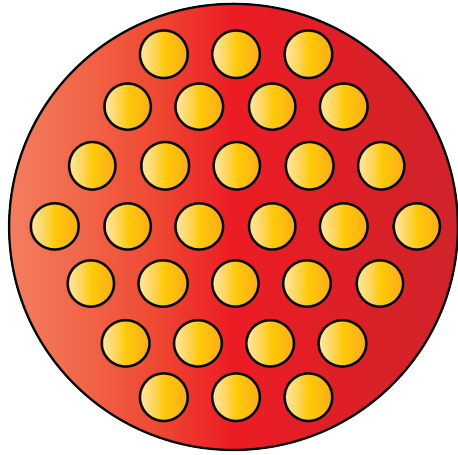




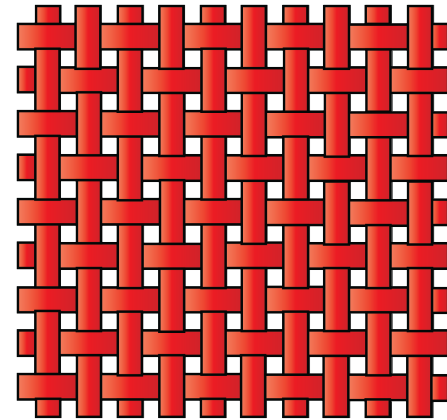
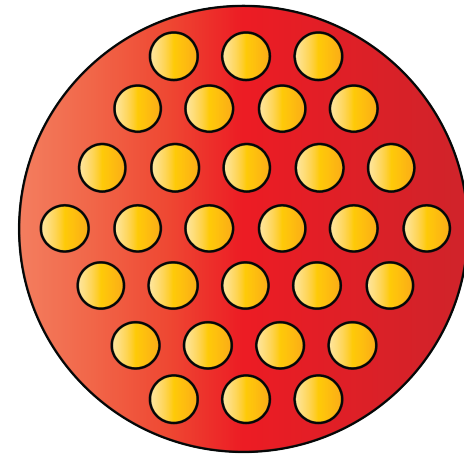




**Why?**

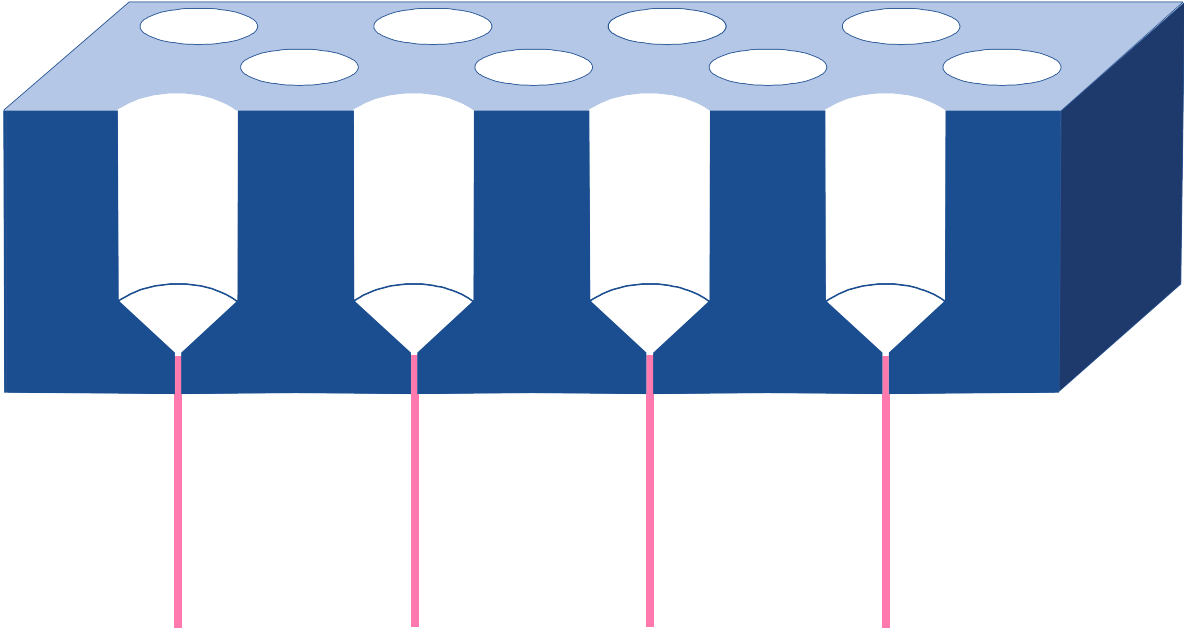


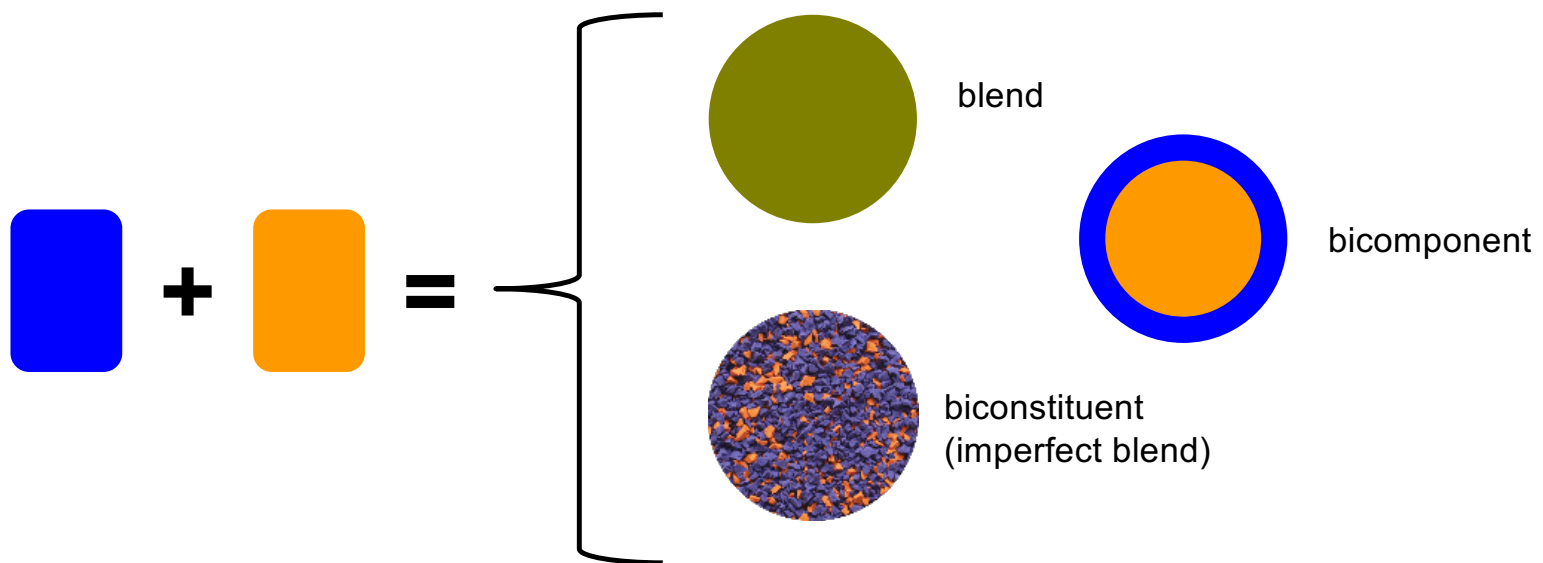
**water**

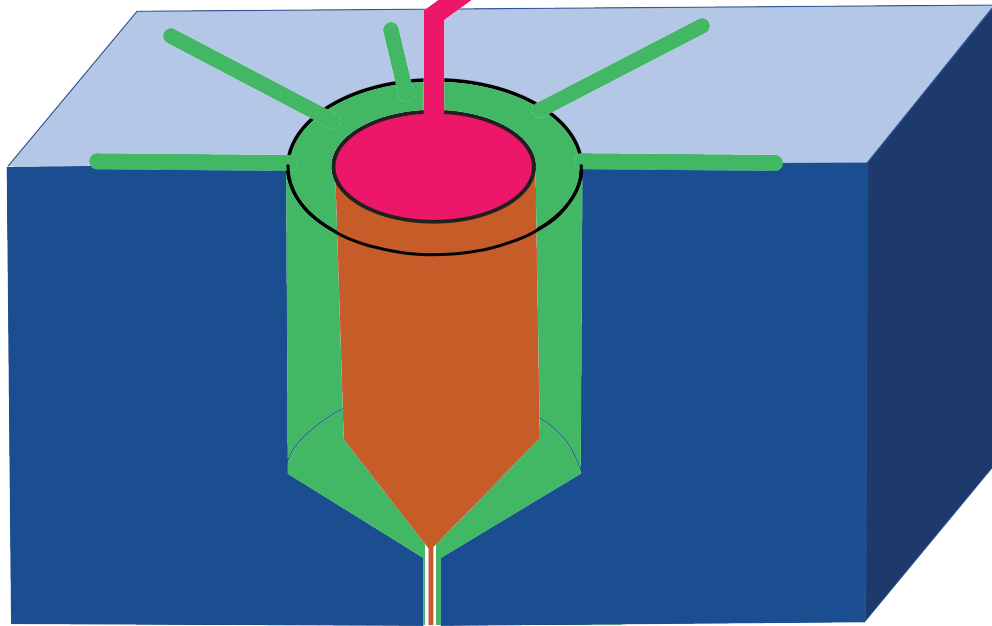
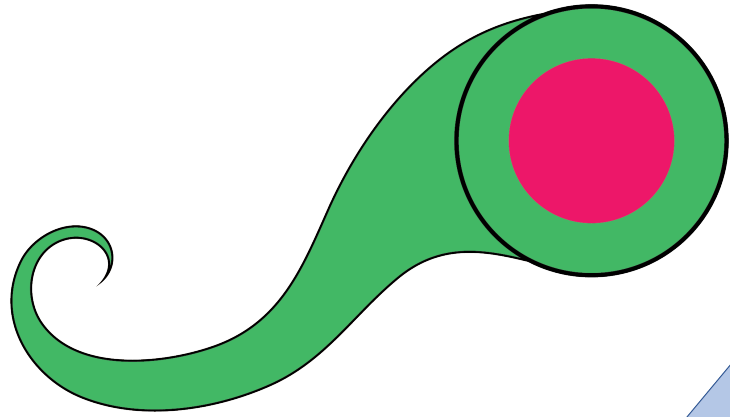




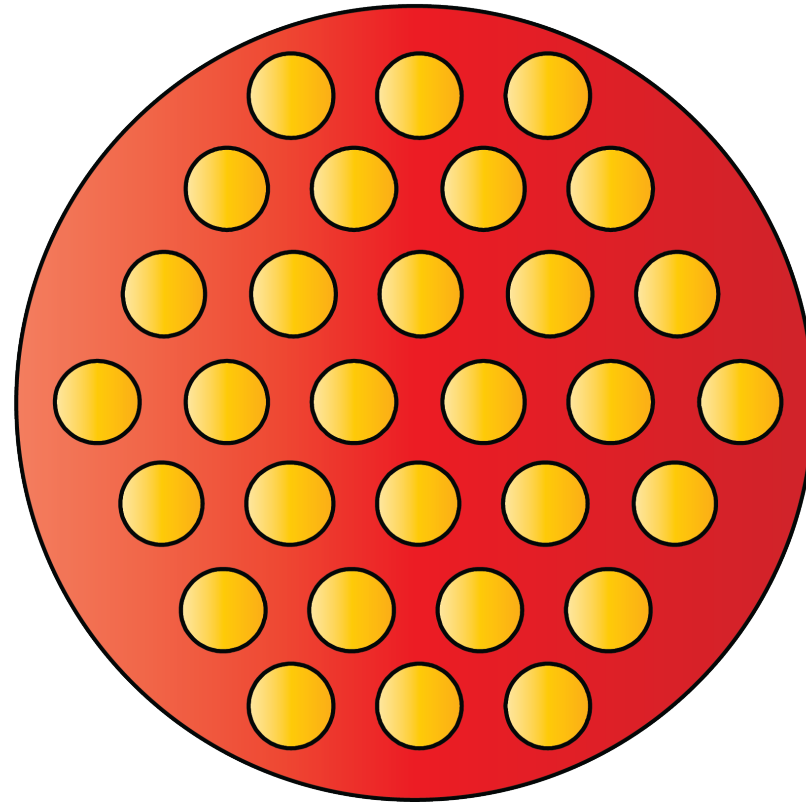
**How?**



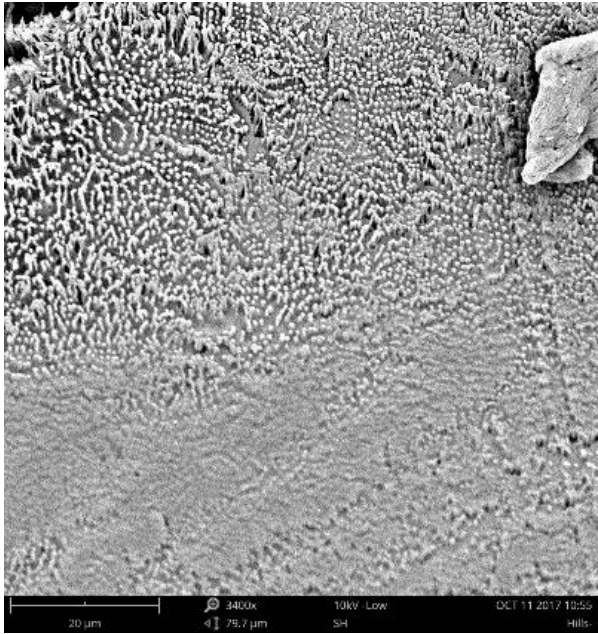
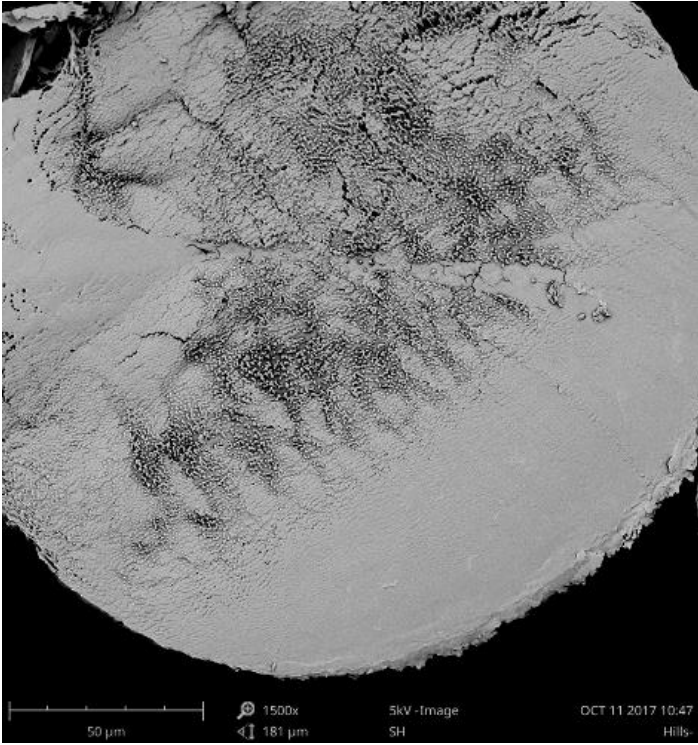




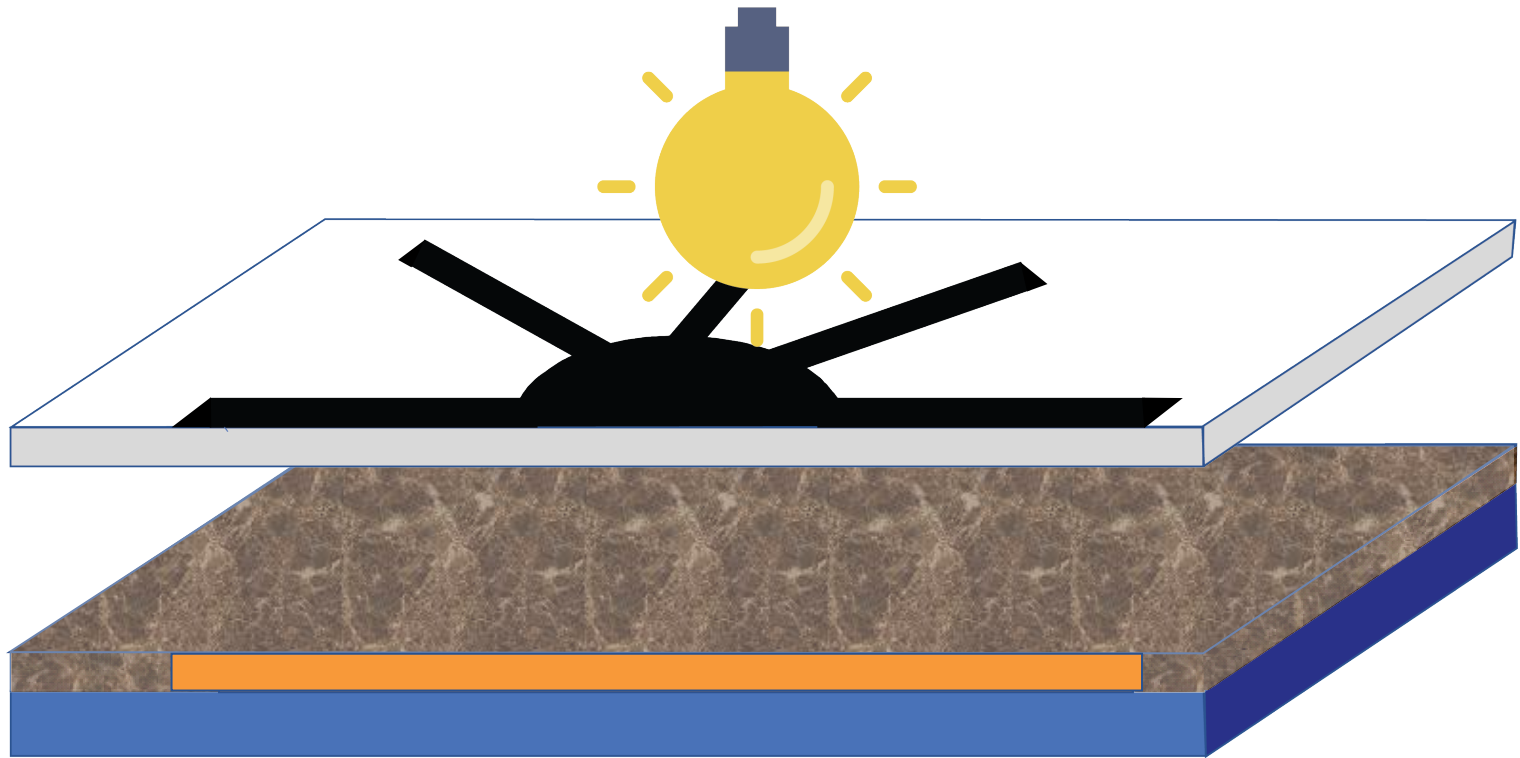


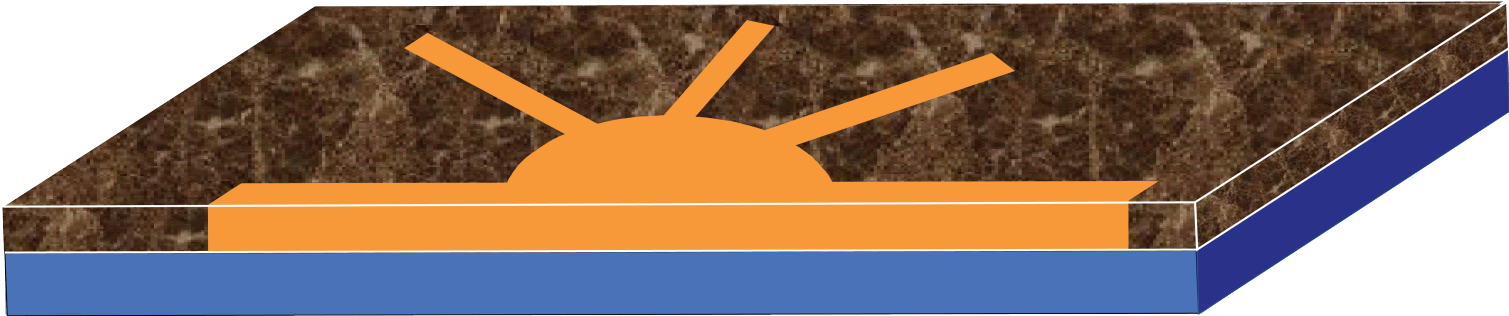


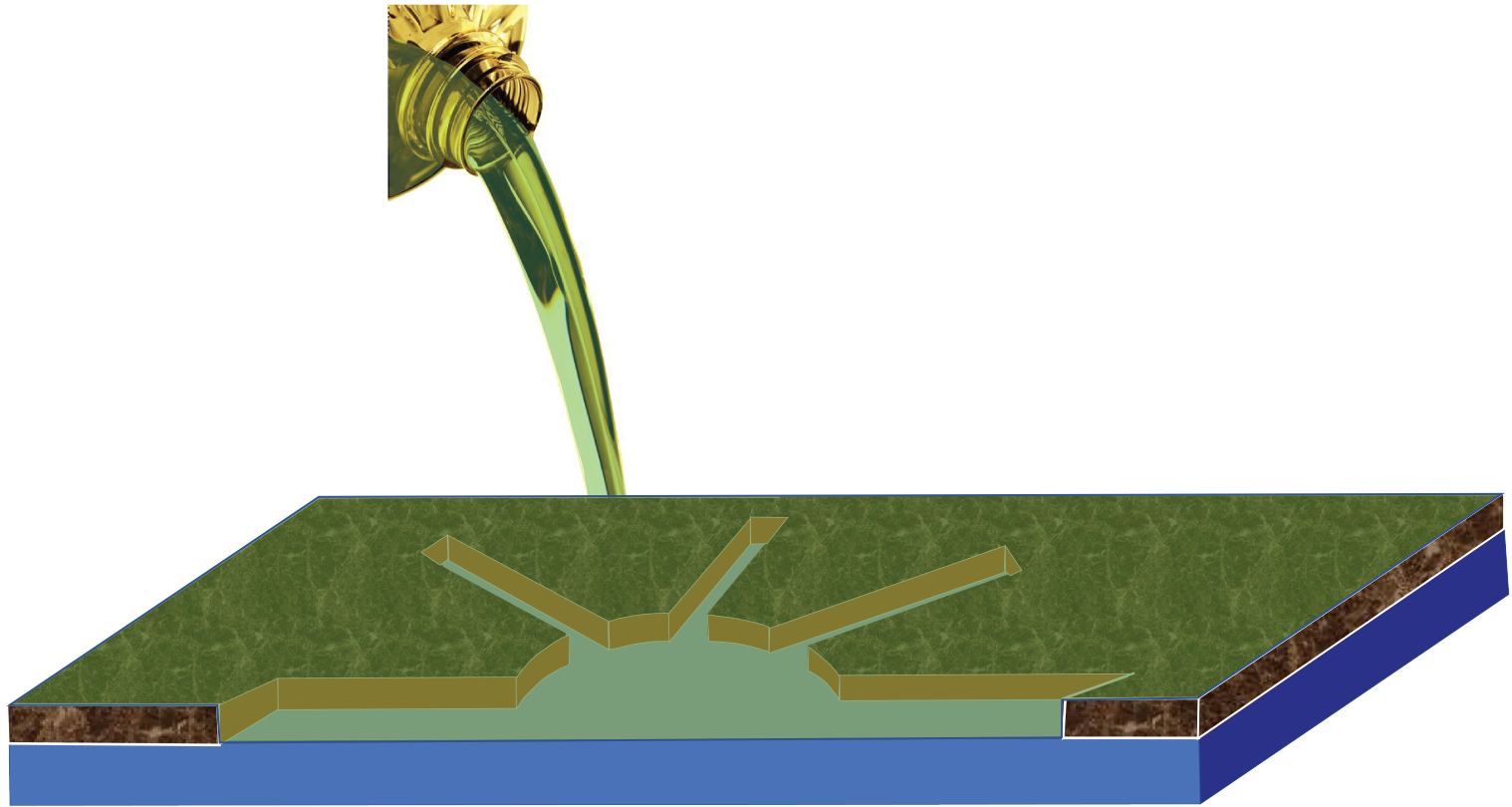
**88,000 “pepperonis”!**

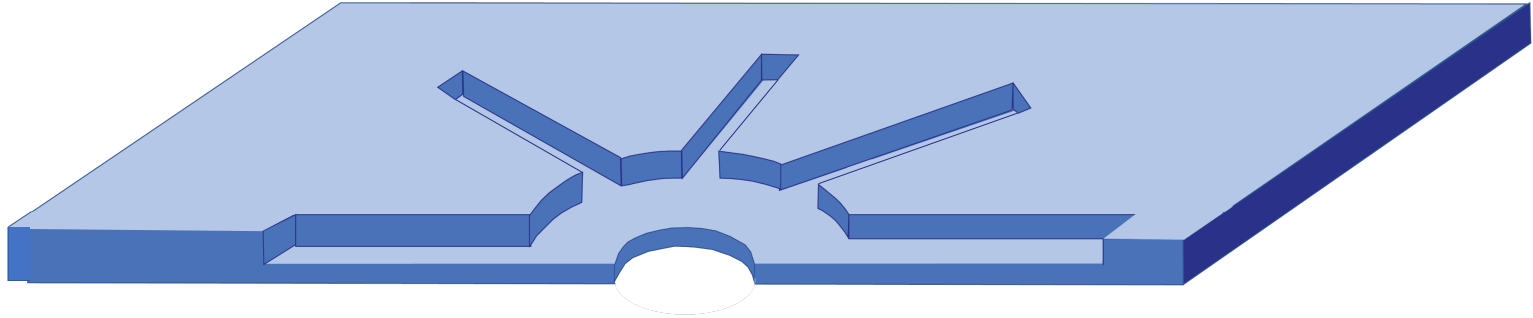


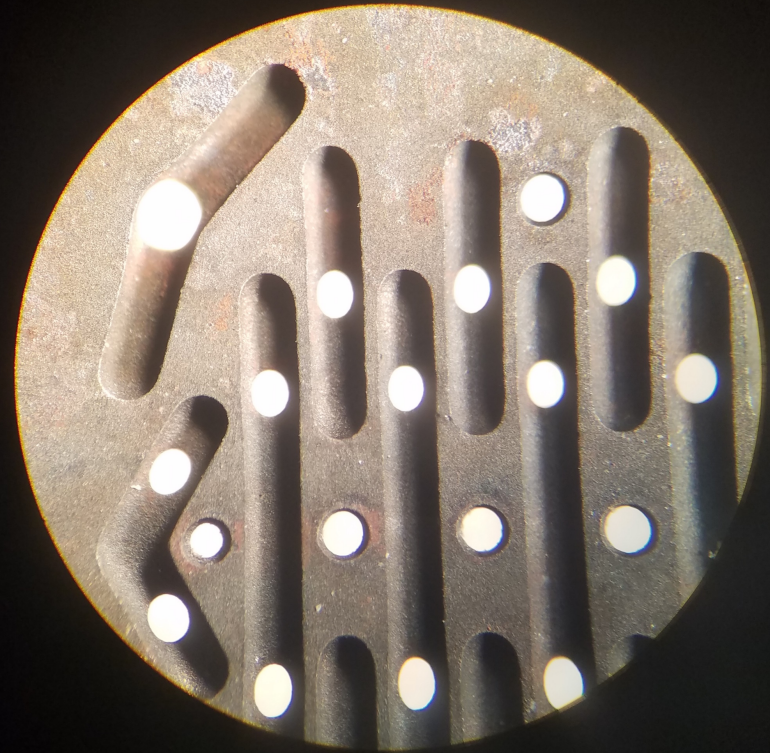
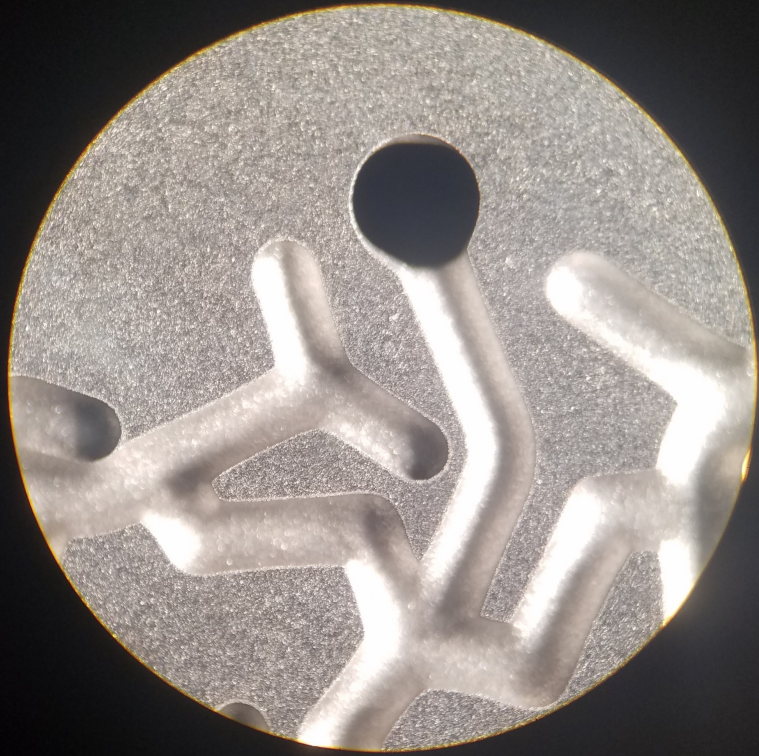
# photolithographic etching













- Impossible = possible

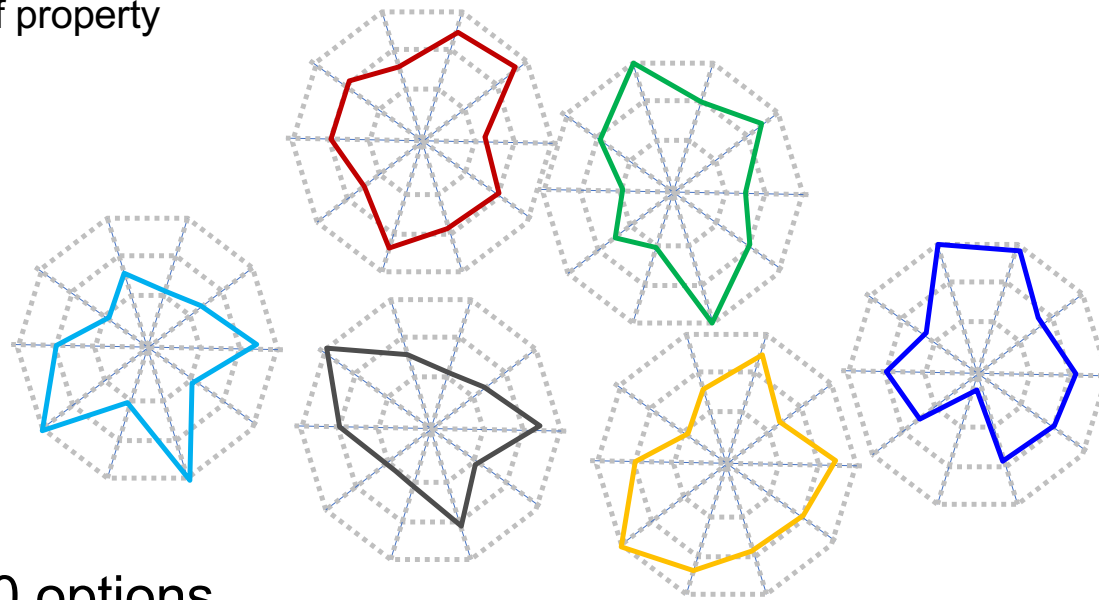
- Cheap

- Quick

**Choose one.**

A “universe” of property profiles:

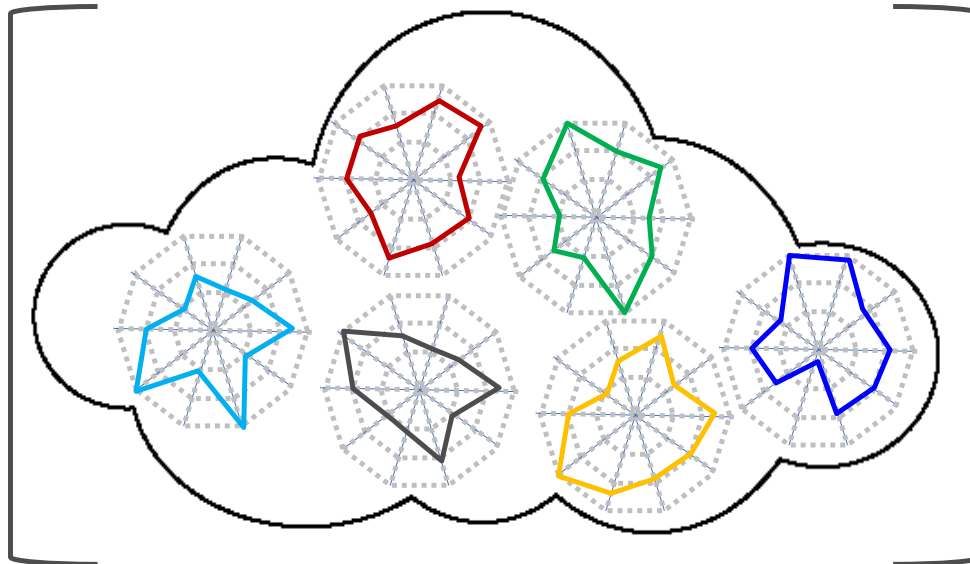
- PET
- Nylon
- PP
- PE
- PLA
- PPS
- ...others



about 6-10 options.

With bicomponent fibers:

- PET(1):PET(2)
- PET:Nylon
- PET:PP
- PET:PE
- PET:PLA
- PET:PPS
- Nylon:PET
- Nylon:PP
- Nylon:PE
- Nylon:PLA
- Nylon:PPS
- Nylon(1):Nylon(2)
- PP:PET
- ...and so on.

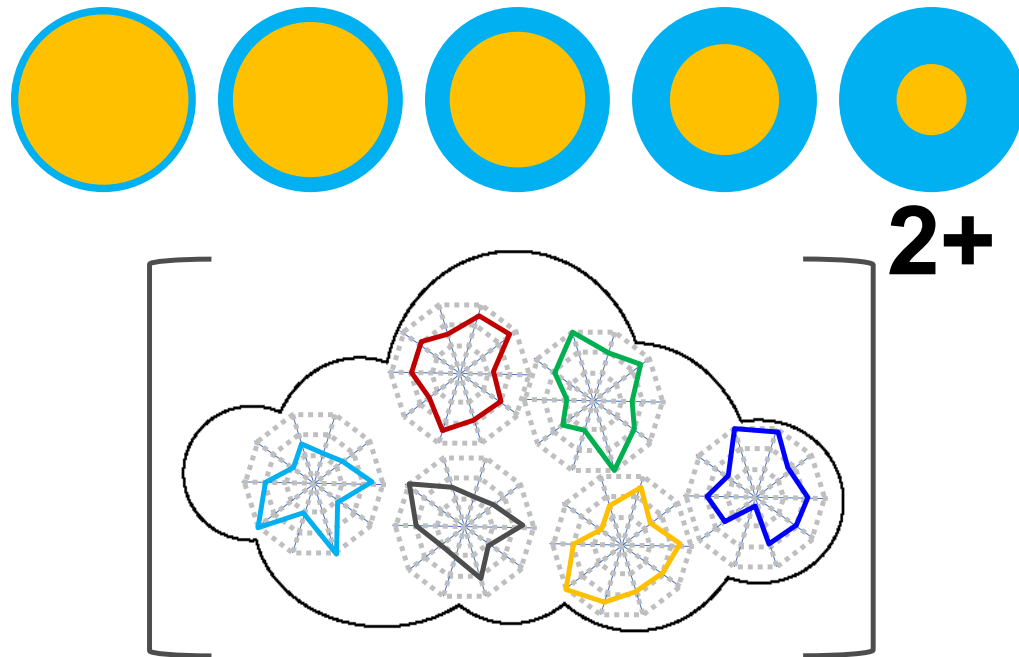


2

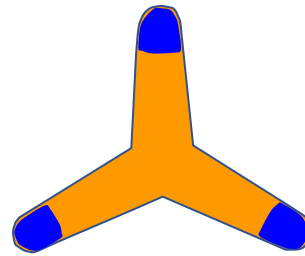
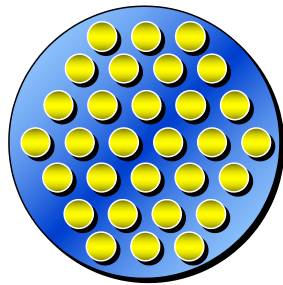
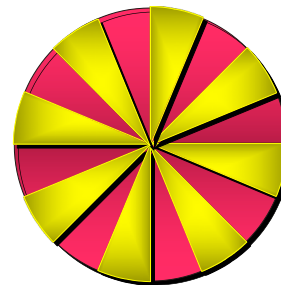
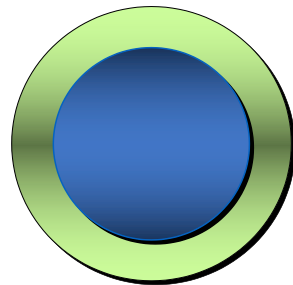
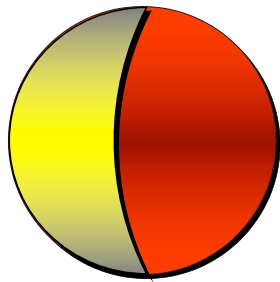
(not just 2x)

With varying polymer ratios:

- PET(1):PET(2) at 50:50
- PET(1):PET(2) at 65:35
- PET(1):PET(2) at 35:65
- PET(1):PET(2) at 80:20
- PET(1):PET(2) at 20:80
- PET(1):Nylon at 50:50
- PET(1):Nylon at 65:35
- PET(1):Nylon at 35:65
- PET(1):Nylon at 80:20
- PET(1):Nylon at 20:80
- PET(1):PP at 50:50
- PET(1):PP at 65:35
- PET(1):PP at 35:65
- ...and so on.



Include various fiber shapes and bicomponent arrangements...

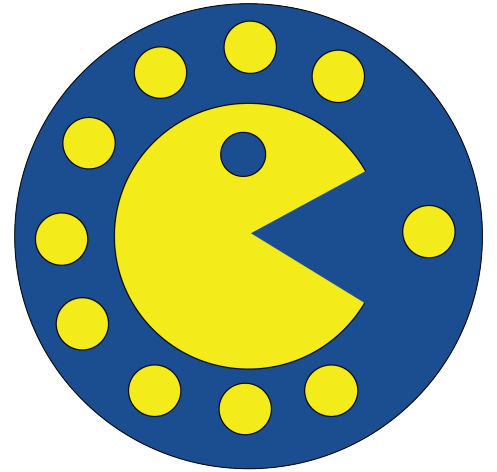
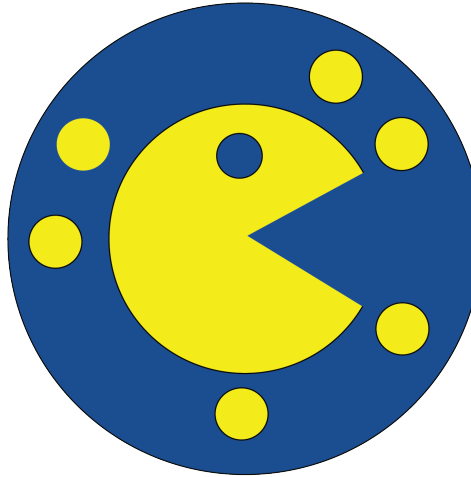
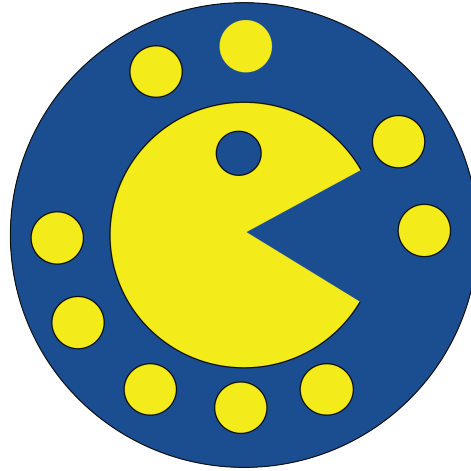
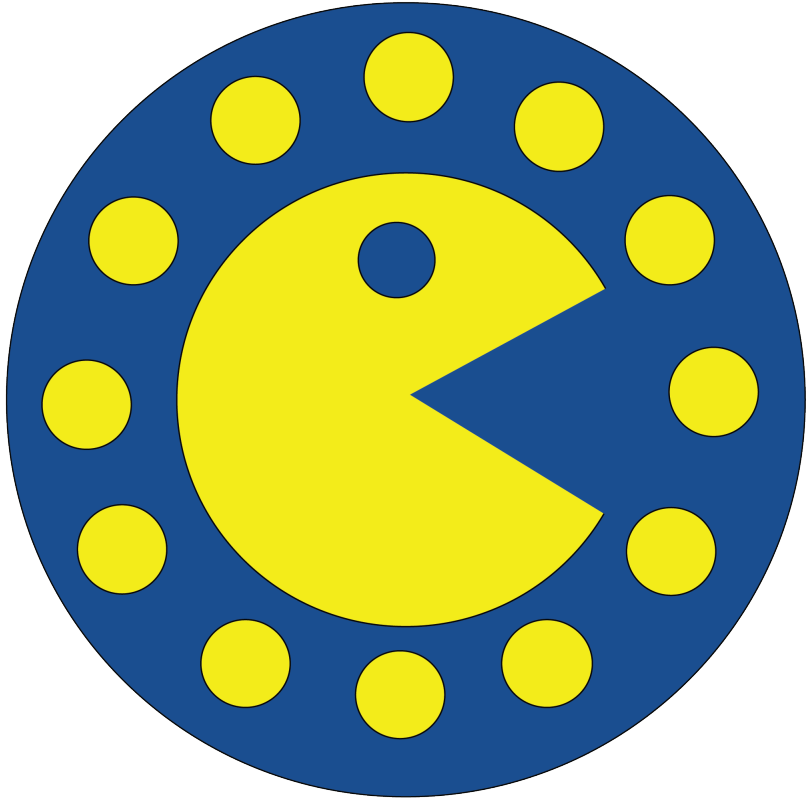


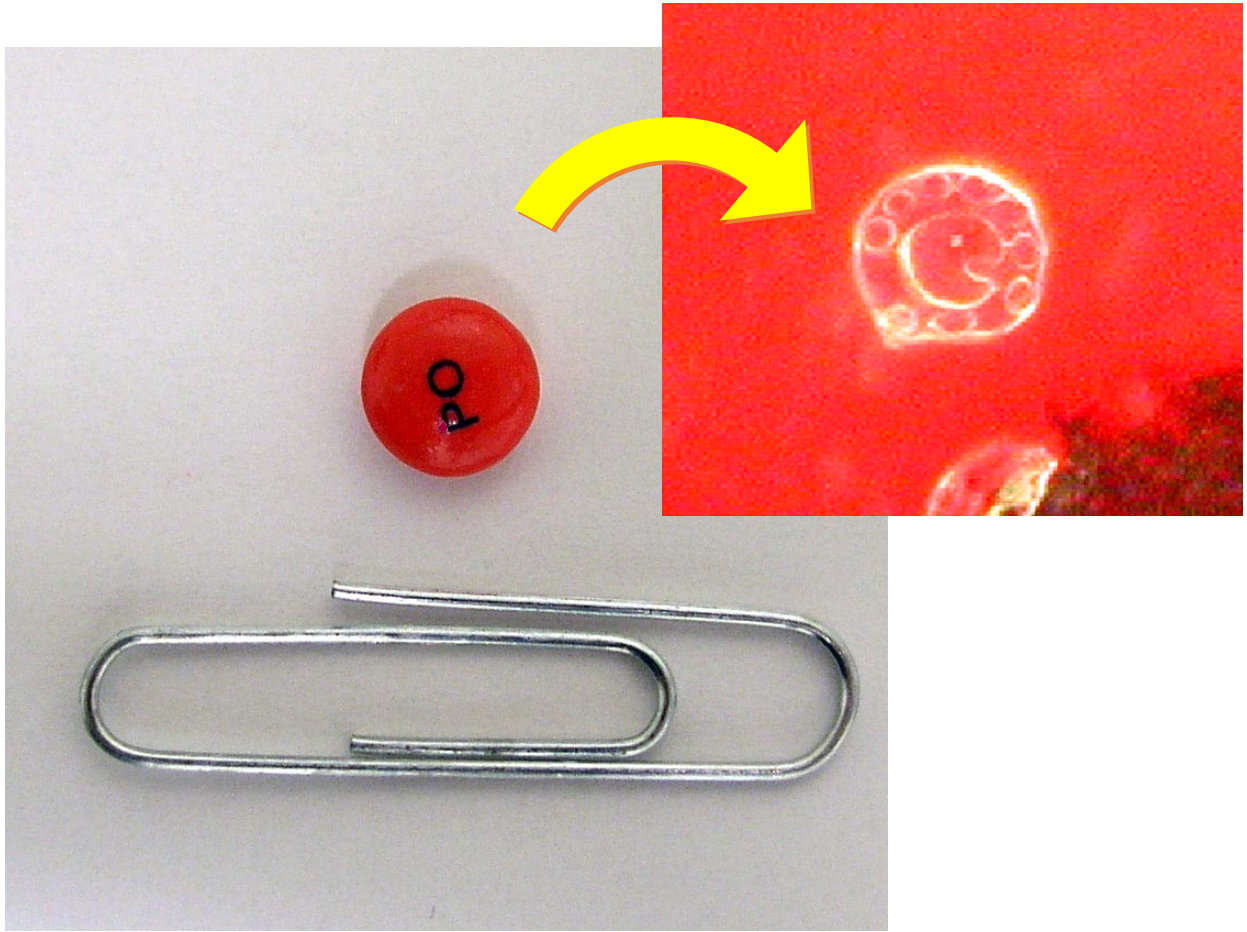
about 6-10 options



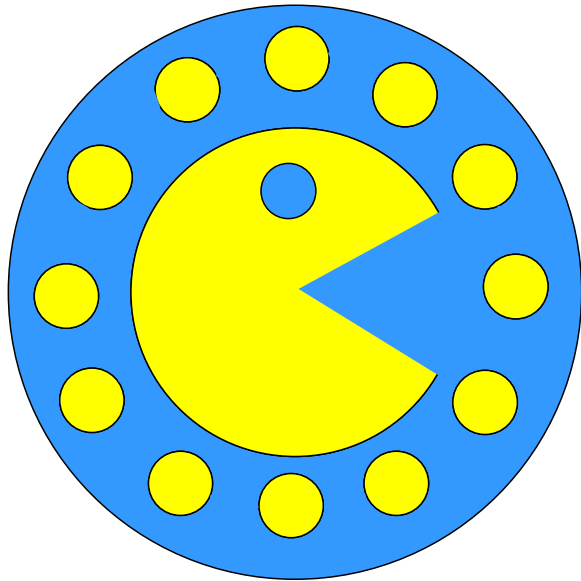
**15 million** (+/-)

a couple of additional examples...





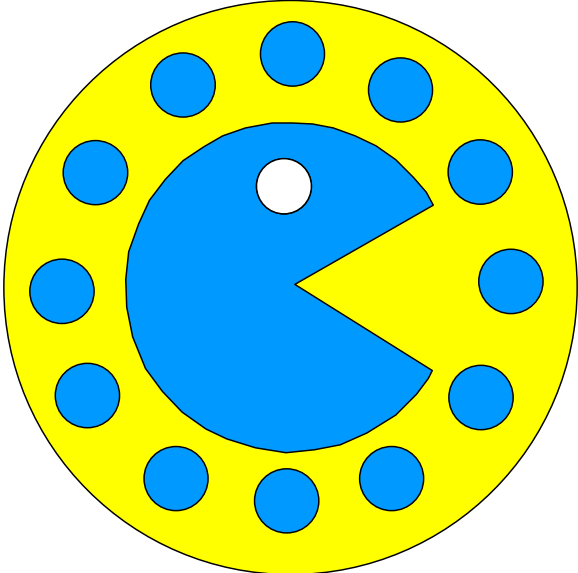


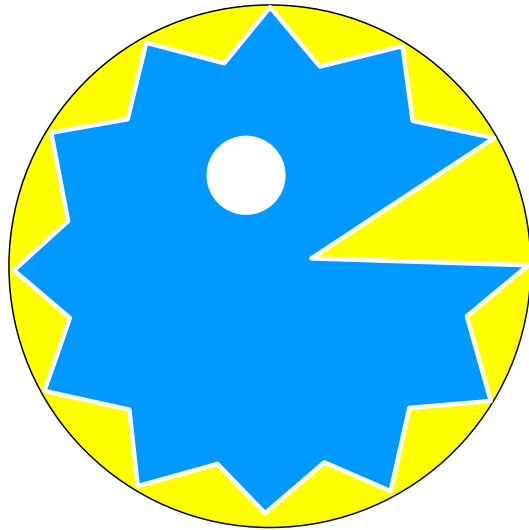


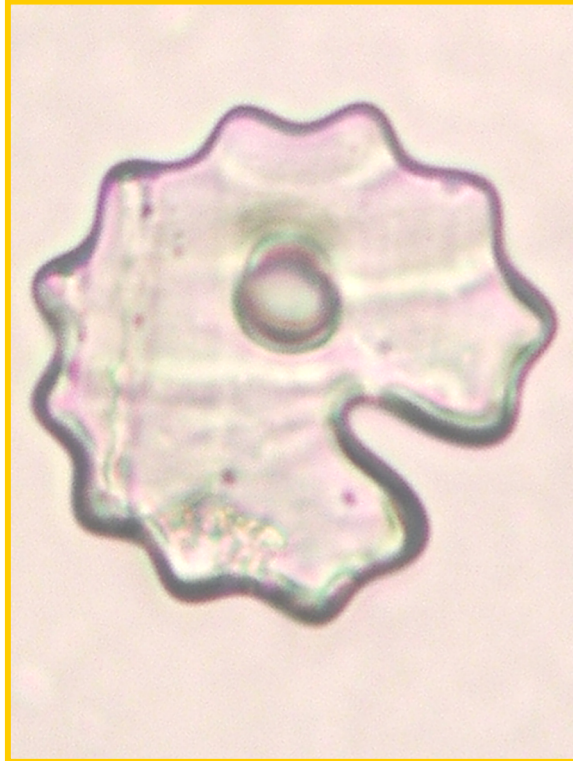
**PLA**

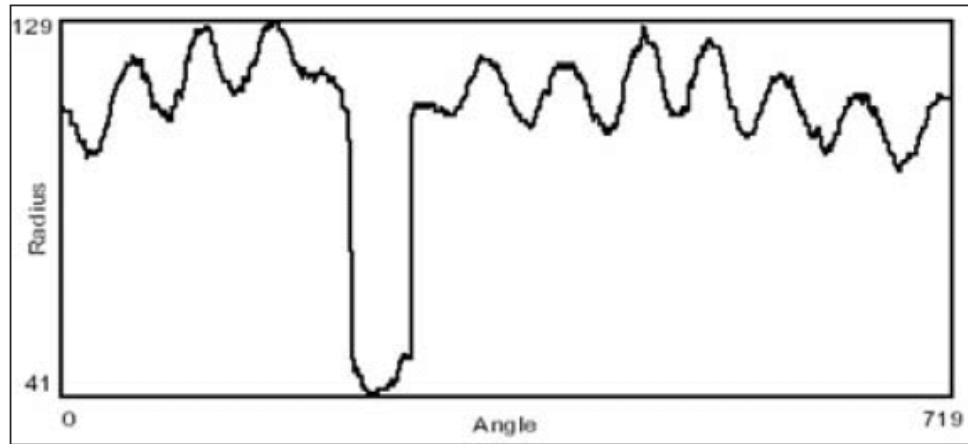
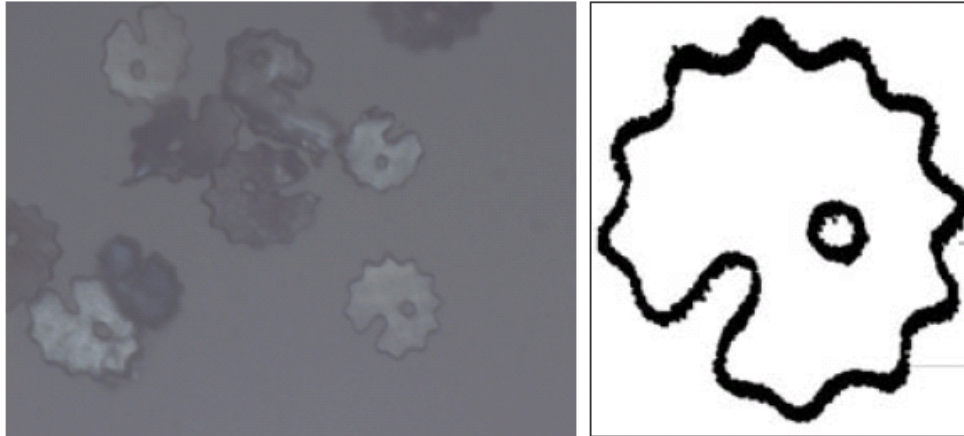


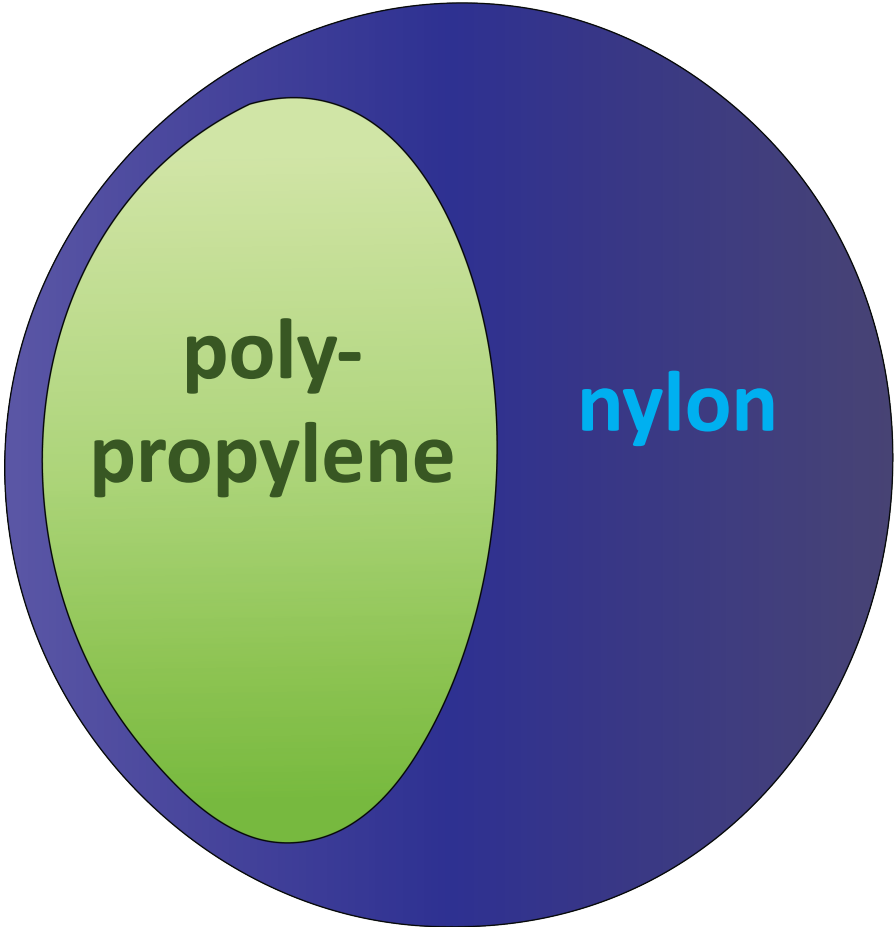
**PVOH**





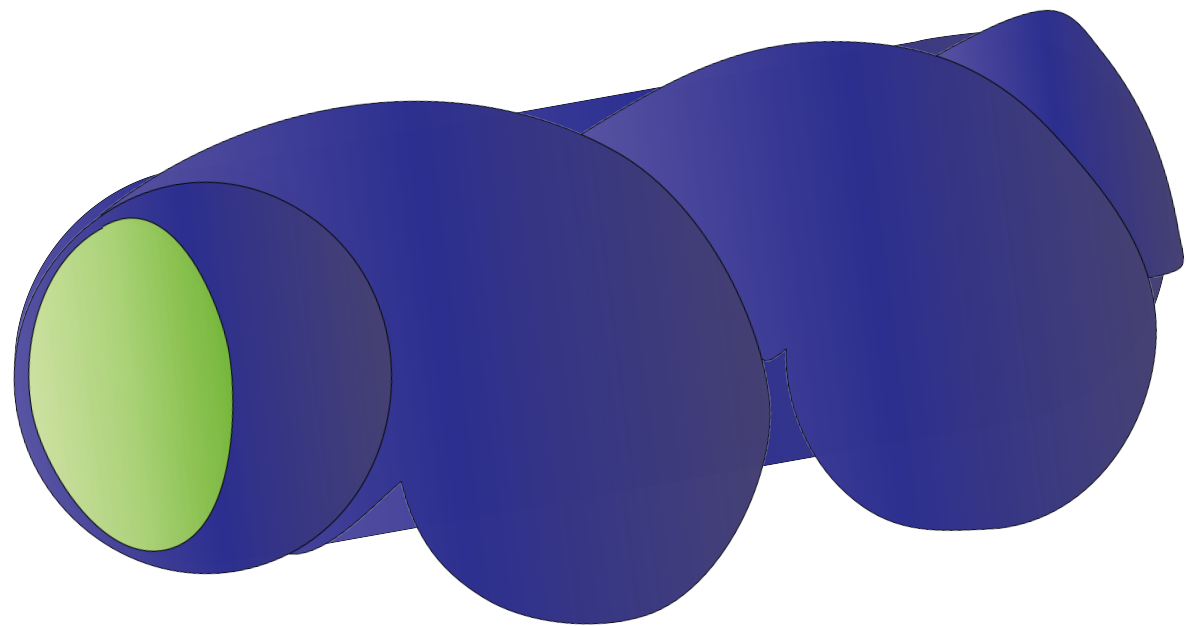


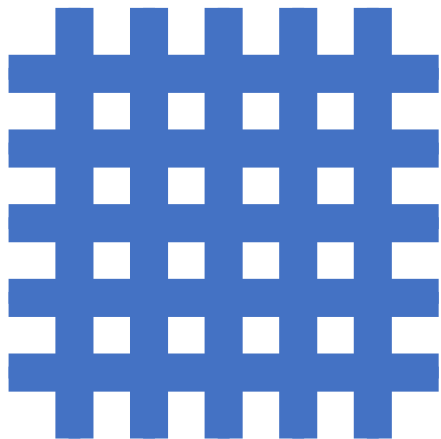




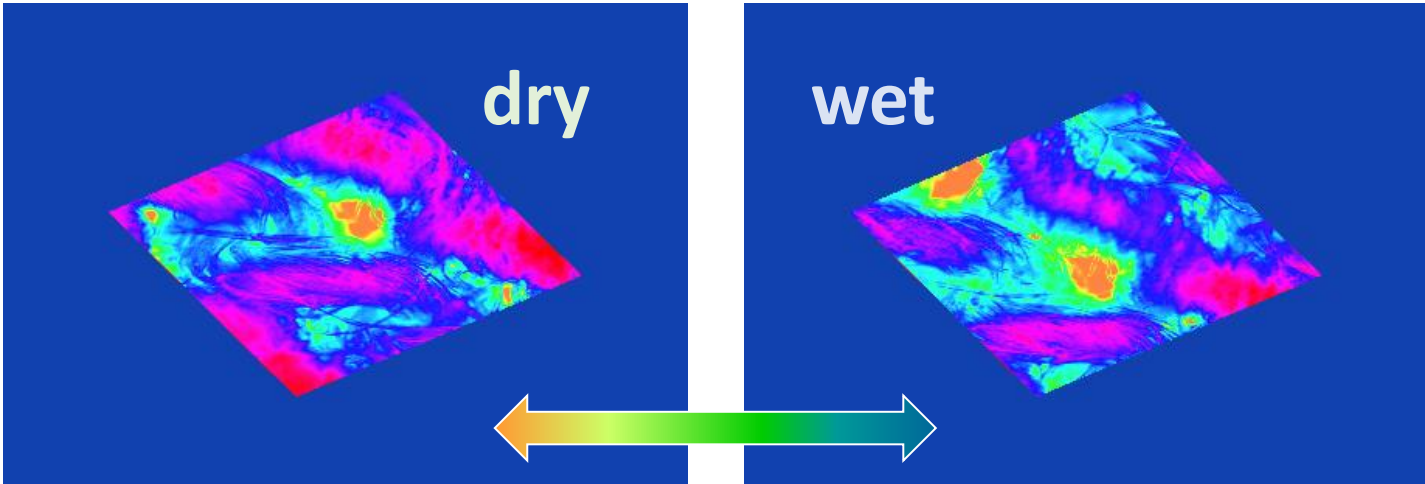
poly-  
propylene

nylon







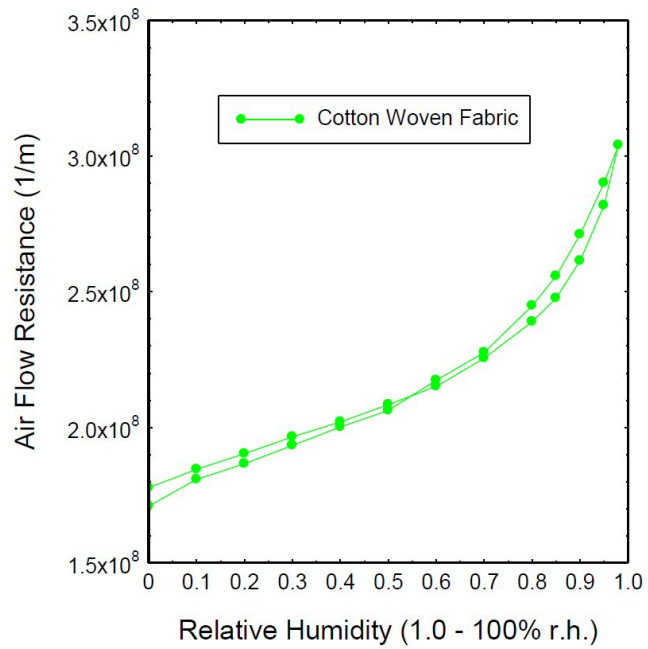


dry

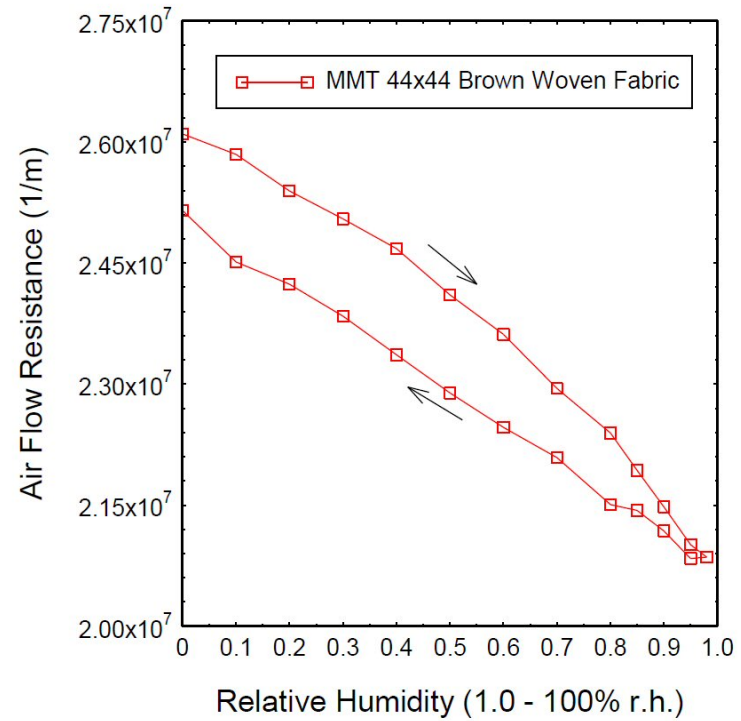
wet

reversible

100% Inotek™ Knit Fabric



## Air permeability as a function of humidity



Data provided by MMT Textiles Ltd.

Test method: Gibson, P.W., Elsaiid, A.E., Kendrick, C.E., Rivin, D., Charmchi, M., "A Test Method to Determine the Relative Humidity Dependence of the Air Permeability of Textile Materials," *Journal of Testing and Evaluation* 25 (4), July, 1997.

Temperature = 30 °C;  
 Gas Flow Rate 2000 cm<sup>3</sup>/minute;  
 Sample Diameter = 3.51 cm;  
 Sample Area = 0.0009678 m<sup>2</sup>





