

SN-PEEK

SN-PEEK COMPOSITE MATERIAL

SINTX SN (Silicon Nitride)-PEEK composite combines the unique and beneficial bioactivity of silicon nitride with the familiar fit, feel, and processing properties of conventional polyetheretherketone (PEEK) polymer.^{1,2} This material is produced by compounding an extremely fine particulate form of SINTX AP² Si₃N₄ bioceramic into an implant grade PEEK matrix. Coating delamination concerns are avoided since the bioceramic is uniformly dispersed throughout the polymer volume instead of adhered to the surface. Subsequent forming operations produce new surfaces with the same enhanced properties as the original stock composite, giving device manufacturers design and process flexibility when working with this material.

MATERIAL PROPERTIES				
Property	SINTX SN-PEEK	Implant Grade PEEK	Units	Test Method
Specific Gravity	1.584	1.291 ¹	---	ASTM D792
		1.3 ²	---	ISO 1183
Tensile Modulus	5808 6036	3600 ¹	MPa	ASTM D638
		---	MPa	ISO 527.1,2:2012(E)
Tensile Strength (Yield)	104 89.7	95 ¹	MPa	ASTM D638
		100-115 ²	MPa	ISO 527.1,2:2012(E)
Tensile Elongation (Yield)	3.79% 3.40%	5.2% ¹	%	ASTM D638
		---	%	ISO 527.1,2:2012(E)
Tensile Elongation (Break)	5.16% 5.00%	35% ¹	%	ASTM D638
		20-40% ²	%	ISO 527.1,2:2012(E)
Flexural Modulus	5621 5985	4000 ¹	MPa	ASTM D790
		4000-4200 ²	MPa	ISO 178:210/Amd.1:2013(E)
Flexural Strength (Yield)	173	150 ¹	MPa	ASTM D790
Flexural Stress at 3.5% strain	144	---	MPa	ISO 178:210/Amd.1:2013(E)
Flexural Strength (Break)	154	165-170 ²	MPa	ISO 178:210/Amd.1:2013(E)
Flexural Strain (Break)	4.30%	---	%	ISO 178:210/Amd.1:2013(E)
Maximum Compressive Strength	479	135 ²	MPa	ISO 604:2002(E)
Deformation at Max. Comp. Str.	66%	---	%	ISO 604:2002(E)
Poisson's Ratio	0.4	0.36 ²	---	ASTM D638-14
Notched Izod Impact Strength	4.3	4.5-7.5 ²	kJ/mm ²	ISO 180:2000/Amd.1:2006(E)
Cytotoxicity	Pass	Pass ¹	---	ISO 10993:5
Chemical Characterization	Pass	Pass ¹	---	ISO10993:18

In addition to exhibiting comparable mechanical properties to monolithic PEEK, SN-PEEK has demonstrated improved imaging properties along with resistance to biofilm formation and up regulation of bone cell activity during testing *in vitro*.³

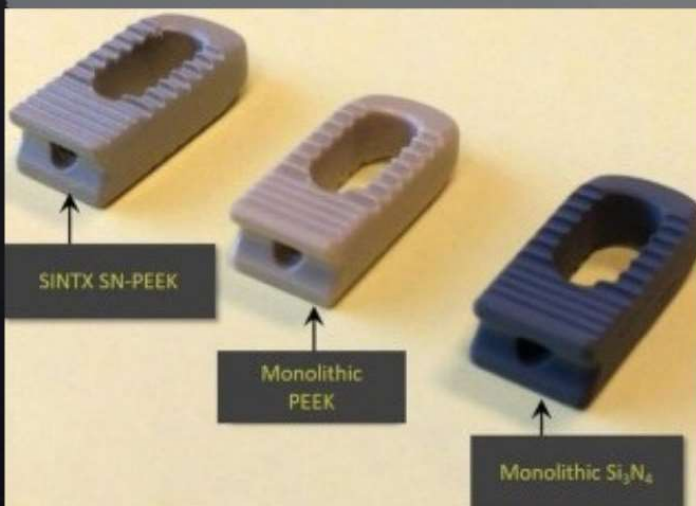
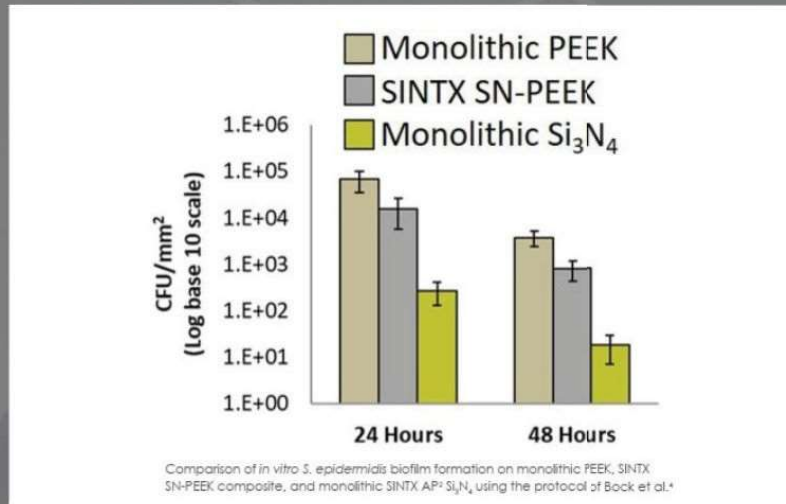
ABOUT SINTX

SINTX Technologies is an OEM ceramics company that develops and commercializes advance ceramics for antipathogenic, biomedical, armor, and industrial applications. SINTX frequently works with customers, partners, and manufacturers to help create new, innovative opportunities across these sectors.

MADE IN THE USA



SN-PEEK



SINTX SN-PEEK composite, PEEK, and monolithic SINTX Si₃N₄ formed into a representative implant geometry.



X-ray radiograph showing various biomaterials beneath a human hand as a demonstration of radiotranslucency (adapted from Pezzotti et al.³)

REFERENCES

1. Pezzotti, G. et al., "Human Osteoblasts Grow Transitional Si/N Apatite in Quickly Osteointegrated Si₃N₄ Cervical Insert," *Acta Biomater.*, 64, 411-420, (2017).
2. Pezzotti, G. et al., "Bioactive Silicon Nitride: A New Therapeutic Material for Osteoarthropathy," *Sci. Rep.*, 7, 44848 (2017).
3. Pezzotti et al., *Macromol. Biosci.* 2018, 1800033.
4. Bock et al., *J. Biomed. Mater. Res. A.* 2017, 105(5):1521-1534.

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