Supplementary material

Table S1. Parametric definition of the TPMS models.

Model	Expression
Diamond	$\cos X \cos Y \cos Z - \sin X \sin Y \sin Z = 0$
IWP	$2(\cos X \cos Y + \cos Y \cos Z + \cos Z \cos X) - (\cos 2X + \cos 2Y + \cos 2Z) = 0$
Gyroid	$\sin Y \cos X + \sin Z \cos Y + \sin X \cos Z = C$

Table S2. Parameters of TMPS models constructed with MSLattice.

No	Model	Gradient of relative density *S*, %	Mesh density
1	IWP700	10	20
2	IWP600	20	20
3	IWP500	30	20
4	IWP400	40	20
5	IWP350	50	20
6	Dmnd	30	22

Table S3. Parameters of TPMS models constructed with MATLAB.

No	Model	*C*	*k*	Structure	Mesh density (D_{ef}) / Wall size, mm
7	Gyr-Sh	0	0.91	Sheet	10 / 0.1
8	Gyr-Sk	0.5	2	Skeletal	10 / 0.0685

Table S4. Parameters of models constructed with SpaceClaim.

No	Model	Unit size, μm	Strut diameter, μm
9	Monolithic	-	-
10	Octa	500	100

Table S5. CAD-measured elementary unit dimensions in a cylindrical specimen.

№	Parameter	1	2	3	4	5	6	7	8	9	10
1	Model	IWP700	IWP600	IWP500	IWP400	IWP350	Dmnd	Gyr-Sh	Gyr-Sk	Mono	Octa
2	Unit size, μm	1000	1000	1000	1000	1000	1100	1000	1370	-	1000
3	Pore size min, μm	613	542	480	423	360	510	500	488	-	
4	Pore size, max, μm	700	591	513	442	376	510	532	510	-	487
5	Wall thickness min, μm	96	170	232	286	346	308	435	511	6000	120
6	Wall thickness max, μm	297	410	487	559	623	427	494	611	6000	220
7	Solid fraction, mm^3	22.35	50.59	77.41	104.38	131.63	75.75	151.06	168	254.46	60.3
9	Porosity, %	91.22	80.12	69.58	58.98	48.27	70.31	40.64	34.13	0	76.29