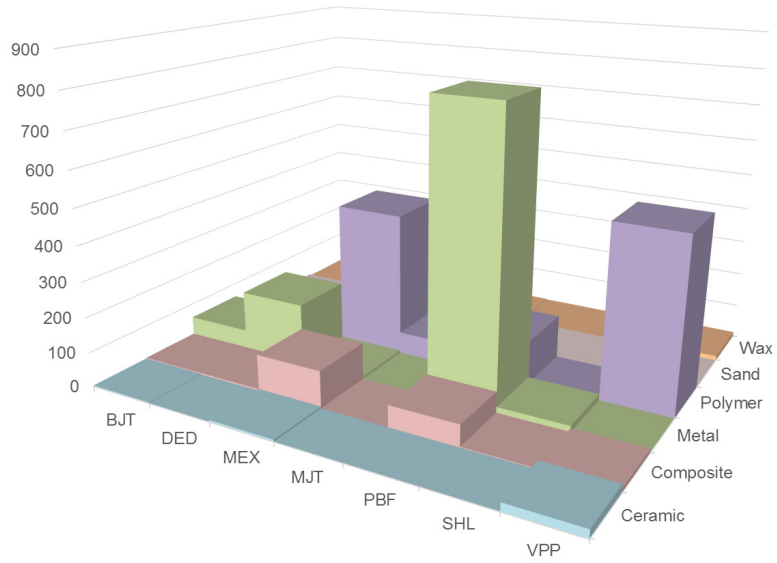
Materials database

Senvol maintains a public database of AM systems and materials, known as the Senvol Database. Specifically, Senvol tracks producers of materials and the products they offer. For example, if a company offers five grades of stainless steel powder for AM, each in four particle-size distributions, the database counts them as 20 individual material products. They can be investigated at senvol.com/material-search. The data has been filtered to omit discontinued products as of March 2020.

Materials by process

The following chart shows the number of material products for each of the seven major AM processes and six types of materials. The data was pulled from the database in early March 2020. Some metal powders are available for multiple processes, such as PBF, DED, and BJT. These materials were counted separately for each process.



Source: Senvol

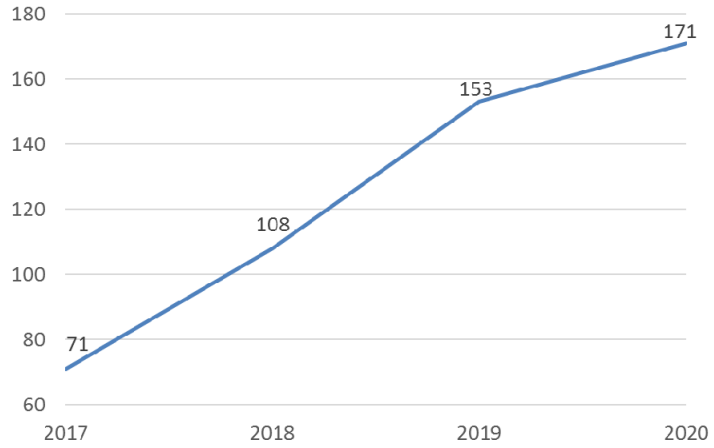
The most diverse materials offering is for metal PBF by a large margin, followed by polymer VPP and MEX, respectively. The data is tabulated as follows.

	BJT	DED	MEX	MJT	PBF	SHL	VPP	Total
Ceramic	3	1	6				24	34
Composite	5	5	106		62	2	12	191
Metal	58	176	7		804	18		904
Polymer	3		412	63	125		492	1095
Sand	5							5
Wax			1	2			13	16
Total	36	60	532	65	831	20	541	2245

Source: Senvol

Materials producers and products

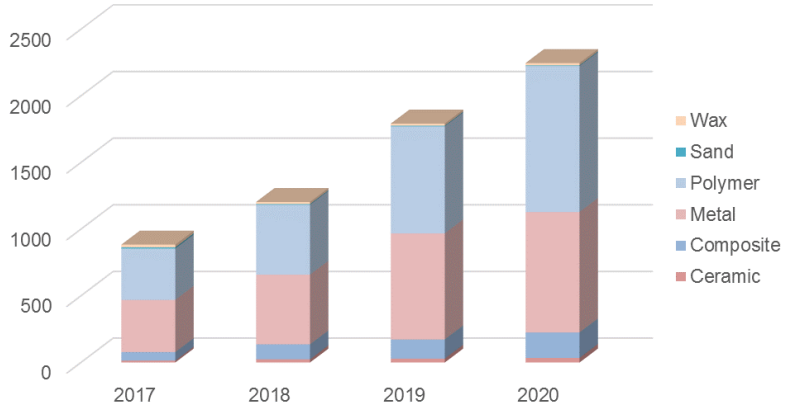
Senvol tracks the companies that supply AM materials. They include AM system manufacturers and producers of third-party materials. The total number of suppliers is listed by year in the following graph. All data used to produce the following charts is from March of each year.



Source: Senvol

The number of material suppliers more than doubled from 2017 to 2019, though growth slowed some in 2020.

The following chart shows the number of commercially available material products by type.



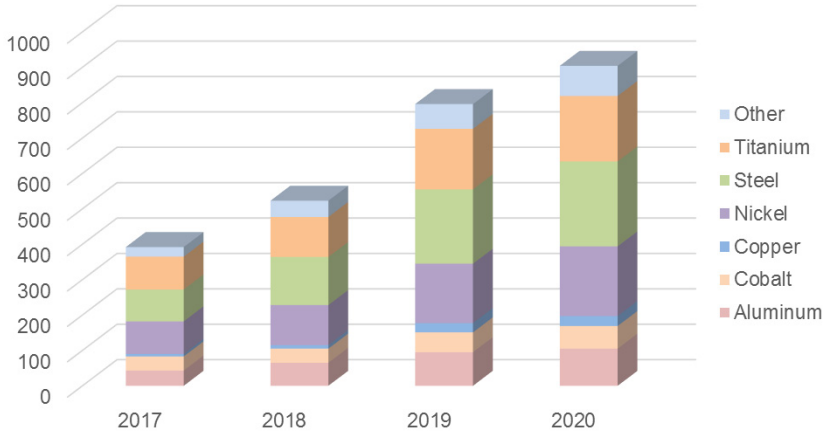
Source: Senvol

Most AM materials are polymers and metals, with composites growing into a notable portion. Ceramic, sand, and wax represent specialized applications and systems, and are only available from a narrow selection of suppliers. The following shows this data in tabulated form.

	2017	2018	2019	2020
Ceramic	14	24	29	34
Composite	64	112	144	191
Metal	392	523	796	904
Polymer	385	524	802	1095
Sand	9	5	5	5
Wax	20	16	16	17

Source: Senvol

The following chart shows metal products available for AM for the past four years. They include filaments, powders, sheets, and wire stock for metal AM processes.



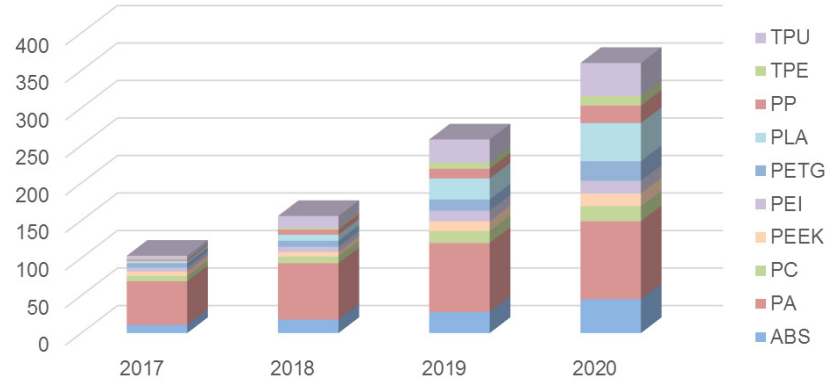
Source: Senvol

Nickel, steel, and titanium products have led the metals market by a large margin, although aluminum products are growing. The "Other" category includes iron, precious metals, and refractory metals. Applications for these metals are increasing, but the materials are available from a limited number of suppliers. Corresponding data from the previous chart is presented in the following table.

	2017	2018	2019	2020
Aluminum	43	65	95	105
Cobalt	40	40	56	64
Copper	7	10	26	28
Nickel	92	113	168	197
Steel	90	136	210	240
Titanium	93	113	171	185
Other	27	46	70	85

Source: Senvol

The following chart shows growth trends in thermoplastic products for AM. They are mainly polymers used in MEX and PBF systems.



Source: Senvol

Polyamide (PA) products dominate the thermoplastics market due to the increasing volumes of PBF machines that use these powders. They include many grades of PA, such as PA6, PA11, and PA12, with PA12 being the most common, by far.

ABS and PLA are mostly used in MEX systems. However, an interesting subcategory is PEI, which is generally sold under SABIC's brand name ULTEM. This plastic has become common for some production applications, but is available from a limited number of suppliers. In this case, the number of products may not correlate directly with the amount of material consumed.

Also notable is an increase in TPE and TPU, which are elastomers used with MEX and, more recently, PBF systems. At Formnext 2019, a growing number of companies displayed elastomers for AM. This segment of materials is expected to diversify.

	2017	2018	2019	2020
ABS	11	18	28	45
PA	58	75	92	104
PC	7	9	16	20
PEEK	6	6	13	17
PEI	5	7	14	17
PETG	6	8	15	26
PLA	3	8	28	51
PP	2	7	13	23
TPE	1	2	8	13
TPU	4	16	31	44

Source: Senvol

Additional data

Go to senvol.com/database to view the properties of AM materials. The database can be used to find equipment and materials using many fields, such as machine build size, material type, AM process type, and material tensile strength.