

Mapping of
actors in advanced
materials in Sweden
Summary



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Kartläggning av aktörer inom avancerade material i Sverige

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Mapping of actors in advanced materials in Sweden - Summary

In the spring of 2021, the Swedish Association of Advanced Materials commissioned an analysis of research and companies that conduct R&D in advanced materials in Sweden. The purpose of the study was to show the importance of advanced materials for Swedish industry.

Since there is no generally accepted definition of advanced materials, we chose in this analysis to use the definition used by PRIMA in Quebec:

An advanced material can be defined as any new or significantly improved material that provides a distinct advantage in (physical or functional) performance when compared to conventional materials.

Today, the development of new and modified materials is of crucial importance for most of the development in our world, also for things that we tend to take for granted. The transition to renewable energy, environmental impact from air transport, fossil-free steel production, a healthcare system that offers new treatments and vaccines are just a few examples of changes that require continuous development of materials to meet new requirements and enable new solutions. In other words, advanced materials are a prerequisite for sustainable development.

How the study was conducted

The survey was conducted in three phases. First, material areas that were to be included in the study were selected. These were Electronics and photonics, Energy-related materials, Glass, Carbide, Composites, Light metals, Polymers and bio-based polymers, Porous materials and Special steels. In the second phase, companies and research groups in Sweden that are active in each area were identified. For companies, R&D or manufacturing in the field was a requirement. In the third phase, quantitative analyzes were performed on data from annual reports for the 190 identified companies. In order to avoid overestimations, based on the companies' net sales, a rough estimate was made of how large a share of the business can be assumed to relate to R&D and/or the production of the material in question.

Turnover have increased for companies in advanced materials

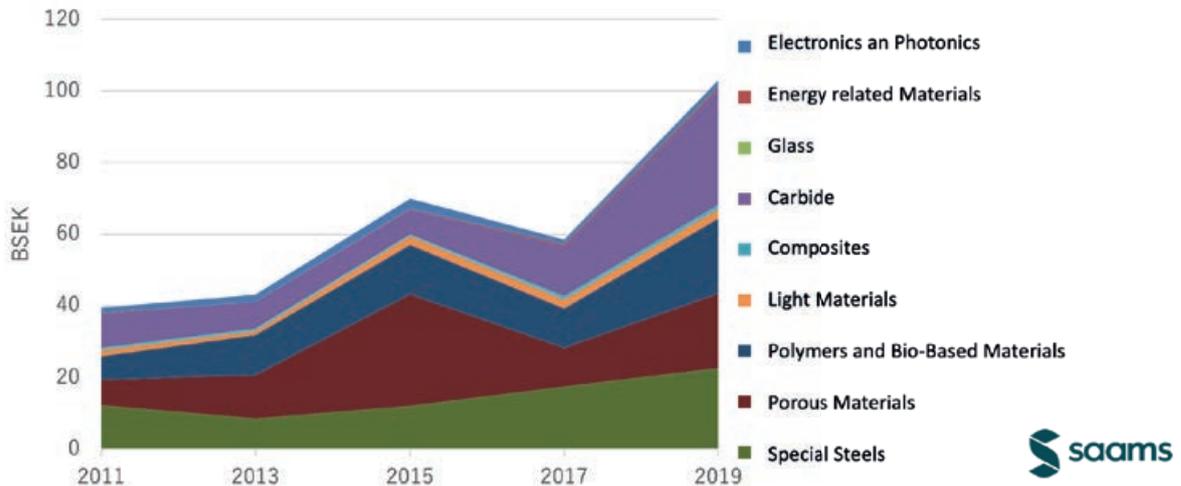
The analysis shows that net sales at the aggregate level have increased from SEK 259 billion to SEK 302 billion between 2011 and 2019. The industry's total net sales in 2019 were SEK 9,518 billion, which means that companies active in these advanced materials correspond to 3.2 per cent. The corresponding share of the manufacturing industry in 2019 was 22 percent.

Sales differ significantly between the analyzed areas. The companies active in special steels (SEK 110 billion) and cemented carbide (SEK 86 billion) clearly had the highest total turnover in 2019, while the companies in glass (SEK 96 million) clearly had the least. However, the two areas with the lowest sales in 2019, energy-related materials and glass, are the ones that have grown the most between 2011 and 2019.

Doubled value added in eight years

The companies' total value added has more than doubled from SEK 39 billion to SEK 103 billion between 2011 and 2019. The business community's total value added in 2019 amounted to SEK 3,522 billion, which means that advanced materials make up 2.9 percent. The corresponding share of the manufacturing industry in 2019 was 21 percent.

Value added 2011-2019



The companies active in cemented carbide (SEK 32 billion) had the highest value added in 2019, followed by the companies in special steels (SEK 23 billion), polymers and bio-based polymers (SEK 21 billion) and porous materials (SEK 21 billion). It is worth noting that the total value added during the period 2011–2019 increased for all areas.

Fewer employees in the companies

The total number of employees has decreased from 115,000 to 92,000 between the years 2011 and 2019, which is probably a consequence of an increasing degree of automation. This means that 2.4 percent of the workforce was active in advanced materials. The corresponding share of the manufacturing industry in 2019 was 18 percent. As in previous analyzes, the companies in cemented carbide (35,000) and special steels (33,000) had the most employees in 2019, while glass only employed 78 people. However, it is the companies in the two smallest areas, i.e. energy-related materials and glass, which have increased the number of employees the most between 2011 and 2019. On the other hand, the companies in electronics and photonics and porous materials have almost half as many employees in 2019 as they had in 2011.

Advanced materials are expected to grow strongly in the coming years

It is worth noting that several recently published forecasts indicate that the global market for advanced materials is expected to grow by 5–10 percent per year over the coming five-year period. We see no reason why Sweden should differ in this respect.

The identified companies thus together make up approximately 2–3 per cent of the Swedish business community in terms of turnover, value added and number of employees, but it would be a mistake to interpret this as meaning that advanced materials are not so important for Sweden. First of all, the companies that have been included in the study are only companies that conduct R&D on and/or production of advanced materials. There are many more companies - and public organizations - that use and are dependent on advanced materials, as

well as many universities and institutes that research advanced materials. However, this study has not had the task of quantifying how large parts of the private and public sector are overall in one way or another active in or dependent on advanced materials. In addition, it is well established that a job in the manufacturing industry creates additional jobs for subcontractors and service companies (and thus contributions to sales and value added), so there is also a multiplier effect beyond the own business sector.

Advanced materials are a key to future societal development

Sweden has many researchers and companies that develop and manufacture advanced materials, but the country has even more companies that use advanced materials. Advanced materials and the expertise about them are thus important for the competitiveness of many companies, but since the companies are spread over almost all business sectors and they are part of difficult-to-study value chains, it is a challenge to identify them.

Finally, interpret the results with caution

This analysis has been characterized by three challenges. The first is that there is no unambiguous definition of advanced materials. This has meant that a selection of material areas that are considered to be most relevant from a Swedish perspective has been analyzed.

The second challenge is that the areas are difficult to delimit and to analyze, depending partly on the number of actors and partly on the number of constituent areas. This has resulted in the mapping has different depth in different areas, which means that it is difficult to make comparisons between the analyzed areas. The analysis has probably not succeeded in identifying all relevant companies in all areas.

A third challenge is that in practice it is impossible to correctly estimate how large a part of a company's operations relates to R&D and/or the production of advanced materials. Several companies have also been restructured during the time period and some companies exist in several areas. This relationship has resulted in us using a simplified calculation model for how much of a company's operations are advanced materials. We therefore want to remind the reader that trends and comparisons should be interpreted with great caution given the underlying rough generalizations.

The full report in Swedish is available at www.saams.se

