



Nd-Fe-B Patent Landscape, Paul McGuinness

EU ERA-MIN ANTISOLVO PROJECT

June 21, 2021 – 13h-15h

Executive Summary

- ✓ An initial search for patents that might reduce the operating space for the Antisolvo project did not reveal any conflicting patents.

Results

- ✓ By a strange coincidence permanent magnets based on the $\text{Nd}_2\text{Fe}_{14}\text{B}$ tetragonal compound were discovered, and the key inventive claims were filed, during 1982 by both General Motors Corporation and Sumitomo Special Metals Corporation.
- ✓ GM, Sumitomo and a few other groups made their first public announcements at the 1983 MMM Conference in Pittsburgh,

Results

- ✓ In the mid-1980s GM and Sumitomo agreed to cross-license.
 - ✓ GM – controlled meltspun materials
 - ✓ Sumitomo – controlled sintered materials
- ✓ By the mid-1990s licenses had been sold to various magnet producers. Europe had 6 companies with licenses, reportedly paying 6% of turnover.

Results

- ✓ The situation appeared stable, until Chinese producers entered the market in the 1990s.
- ✓ In July, 1998 Sumitomo and MQ (the new name for GM) filed a complaint against several US, Chinese and Taiwanese companies.
- ✓ In 2012, Hitachi Metals Limited the successor of Sumitomo, began flexing its legal muscles and initiated proceedings against companies around the world. Huge litigation.

Results

- ✓ In 2021, all the Hitachi patents cited during the 2012 actions are anticipated to expire as follows:
 - ✓ US 6,461,565 August 3, 2021
 - ✓ US 6,527,874 July 1, 2021
 - ✓ US 6,491,765 May 9, 2021
 - ✓ US 6,537,385 May 9, 2021
- ✓ Hitachi has held more than 600 patents covering Nd-Fe-B magnets.
- ✓ Hitachi has filed more than 30 Nd-Fe-B patents in the last 5 years.

Results

- ✓ **Search criteria.** The search was made using the commercial patent database Patbase. The search terms were as follows:

(recycl* or recover*) + (rare earth or Nd or Pr or Sm or Dy or NdFeB or SmFeN or Nd-Fe-B) + magnet* + precipit*

- ✓ The cut-off date was set as 1 Jan 2011. After the first search an additional restriction was added with the countries where the patent is filed: WO or US or EP.

Results

- ✓ **Results.** The search terms turned up 50 patents. The majority of these patents are filed only in China, Japan, Korea or Russia. The additional restriction, limiting the search to patents registered worldwide, in the US or in the EU, reduced this number to 9. The complete list of patents can be found at the end of this document.
- ✓ **Summary.** Of the patents filed in the WO, US or EP there is no patent referring to antisolvent precipitation.
- ✓ **Next steps.** We will continue to investigate what has been patented and use this information to feed into the project.

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