

Rare Earth Supply Chain+

Oxides (current and under construction)	Metals, Alloys & Powders	Magnets	
Lynas Australia – exp. 2012	Great Western Technologies/ Less Common Metals <i>US/ UK</i>	Samarium Cobalt Manufacturers*	Samarium Cobalt Distributors/ Fabricators**
Molycorp US – exp. 2012 ⁴	Shin Etsu <i>Japan & China</i>	Electron Energy Corporation <i>US</i>	Integrated Magnetics <i>US</i>
Great Western Minerals Group South Africa – exp. 2013	Molycorp Metals and Alloys (formerly Santoku Corporation) <i>US</i>	Arnold Magnetic Technologies <i>US/ Switzerland</i>	Dexter Magnetic Technologies <i>US, UK, China</i>
Japan Oil, Gas & Metals Nat. Corp. (via industry cooperation) <i>Japan</i>	Molycorp Sillamäe <i>Estonia</i>	Zhejiang Tinnau Group <i>China</i>	Quadrant <i>US</i>
China produces 94% of world supply (examples below)	Neo Materials, Magnequench division (powders only) (Acquisition by Molycorp pending) <i>China</i>	Ningbo Co-Star Material High Tech Co. Ltd <i>China</i>	Magnetic Component Engineering, Inc. <i>US</i>
Sichuan Mianning Mining Co <i>China</i>	CAS Key Laboratory of Rare Earth Chemistry and Physics <i>China</i>	Nanjing Chuangken Magnetism Co. Ltd <i>China</i>	Bunting <i>US</i>
Jiangxi Copper <i>China</i>	Zhe Jiang Zhao-Ri-Ke Magnet Industries (NdFeB powders) <i>China</i>	Ningbo Ninggang Perm. Magnetic Materials Co. Ltd <i>China</i>	Adams <i>US</i>
Baotou Steel Rare Earth <i>China</i>	Aichi Steel Corporation (NdFeB powders) <i>Japan</i>	Shin Etsu <i>Japan</i>	Magnet Sales <i>US</i>
China Minmetals <i>China</i>	Showa Denko <i>Japan</i>	Vacuumschmelze GmbH/ Neorem <i>Germany/ Finland</i>	Stanford Magnetics <i>US</i>
Neo Materials, Performance Materials Division (JAMR & ZAMR) (Acquisition by Molycorp pending) <i>China</i>	Sumitomo <i>Japan</i>	Chengdu Magnetic Material Science & Technology Company <i>China</i>	Dure Magnetic <i>US</i>
<p>*Manufacturers typically create their own proprietary alloys, and either cast or sinter magnets from those alloys. Control over the quality of the alloys is an important distinction of this group, as they are not typically dependent on overseas material suppliers. In addition to cast and sintering capabilities, the magnet manufacturers also typically utilize heat treating processes, in order to further enhance the properties of the magnets. The magnet manufacturers generally maintain a full range of manufacturing capabilities, to enable them to manufacture all forms of custom designs and applications. Magnet manufacturers can also fabricate high value components utilizing the magnets they have made.</p> <p>**Distributor/Fabricators typically import overseas material and resell it to domestic customers. Many merely pass product through from manufacturers to end-users. Others do some minimal grinding. The more sophisticated of the lot will fabricate higher value components using imported magnets. These companies also often work with various non-rare earth magnets including AlNiCo, Ferrite, and others.</p> <p>¹ Plans to manufacture Neodymium Magnets (NdFeB) ² Plans to manufacture Samarium Cobalt Magnets (SmCo) ³ Past manufacturer of Neodymium Magnets (NdFeB) ⁴ Exp date reflects Project Phoenix phase 1 completion date ⁵ Plans to manufacture Neodymium Magnets (NdFeB) in US by 2013 ⁶ Signed a joint venture agreement to manufacture Neodymium Magnets (NdFeB) in 2013 +Examples, not an inclusive list</p>		Neodymium Iron Boron Manufacturers*	Applied Magnets <i>US</i>
	Hitachi Metals ⁵ <i>Japan/US</i>	Ningbo Lihe Permanent Magnetic Materials <i>China</i>	
	Vacuumschmelze GmbH/ Neorem <i>Germany/ Finland</i>	Ningbo Xionghai Magnetics & Mechanism Industrial Co. Ltd. <i>China</i>	
	Beijing Jingci Magnetism Technology Co. <i>China</i>	Compass Magnets & Components <i>China</i>	
	Zhejiang Tinnau Group <i>China</i>	Neodymium Iron Boron Distributors/ Fabricators**	
	Ningbo Co-Star Material High Tech Co. Ltd <i>China</i>	Dexter Magnetic Technologies <i>US, UK, China</i>	
	Nanjing Chuangken Magnetism Co. Ltd <i>China</i>	ForceField <i>US</i>	
	Advanced Technology & Materials Co., Ltd. <i>China</i>	KJ Magnetics <i>US</i>	
	San Huan New Material High-Tech Inc. <i>China</i>	Allstar <i>US</i>	
	Thinova Co., Ltd. <i>China</i>	Quadrant <i>US</i>	
	Ningbo Yunsheng Co., Ltd. <i>China</i>	Adams <i>US</i>	
	Shin Etsu <i>Japan</i>	Bunting <i>US</i>	
	TDK <i>Japan</i>	Magnetic Component Engineering, Inc. <i>US</i>	
	Thomas and Skinner ^{1,3} <i>US</i>	Magnet Sales <i>US</i>	
	Daido Steel, Mitsubishi, Molycorp ⁶ <i>Japan</i>	Stanford Magnetics <i>US</i>	
	Dure Magnetic <i>US</i>		
	Integrated Magnetics <i>US</i>		
	Ningbo Lihe Permanent Magnetic Materials <i>China</i>		
	Ningbo Xionghai Magnetics & Mechanism Industrial Co. Ltd. <i>China</i>		
	Compass Magnets & Components <i>China</i>		