

The View from Slovenia

I need to begin my article with a mea culpa. In my last piece for this space, I made the bold claim that we are living in the golden age of samarium cobalt magnets, based primarily on the relatively low prices for the raw materials. Perhaps I didn't speak soon enough. At essentially the same time I e-mailed the article off to Heather Krier, the price of samarium shot upward, as captured in the chart below. Today (October 26, 2010), samarium prices stand at 34 to 35 \$/kg for the oxide and 50 to 53 \$/kg for the metal, FOB China, according to the information found on Metal Pages. This surge in prices may signal the end of the golden age of samarium cobalt and the beginning of an era signified by a less noble metal. Samarium appears to be caught up in the chaos that has become the rare earth marketplace, joining its neighbors in the periodic table. There is some small amount of gratification in the fact that I warned it would end eventually, I just didn't realize how quickly that might happen!

Near the end of the summer, I had the good fortune to attend the 21st Rare Earth Permanent Magnet workshop in Bled, Slovenia. Nestled in the eastern part of the Alps, with scenes that reminded me of the movie *The Sound of Music*, Bled is a very picturesque and hospitable location for a conference of any kind. Beyond that, the logistics, facilities and evening entertainment were all first-rate. The organizers did a marvelous job in putting this conference together.

There were two parts of the technical discussion that I found very interesting. The first session was about raw materials, an area near and dear to me. There is obviously concern about the continued availability of rare earths coming out of China, and their pricing. And there were several excellent presentations, although it is clear, based on the questions that were asked after some of the presentations, that not everyone completely grasps the complexity of the current situation. This is a chaotic time in the rare earth marketplace; there is much con-

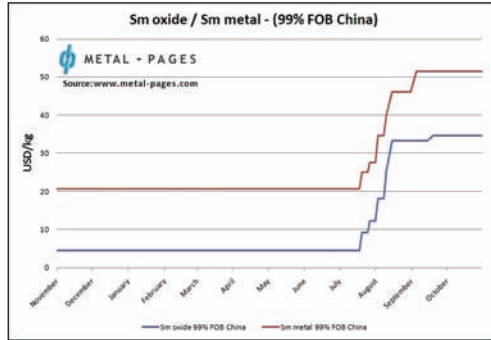
flicting information flying around and it is easy to be confused. However we need to be careful to make a very clear distinction between information that can be substantiated and conjecture. Otherwise we run the risk of making things worse rather than making things better. In the words of the Serenity Prayer, we need "the wisdom to know the difference."

I was also intrigued by the work of several Japanese groups in a session called "Dy saving NdFeB magnets." The idea is to achieve high coercivity in NdFeB magnets by using less dysprosium and/or terbium. Under consideration are ways to deliver the heavy rare earths either directly in the grain boundary or in the main Nd₂Fe₁₄B phase near the grain boundary, where they are likely to yield the largest benefit. It is a good example of the wise use of our resources. This is a very important research target and the speakers showed a few promising approaches and results. It is also an excellent example of collaborative research among several institutions, something we need to do more often.

Let me make two final comments, on other subjects of interest. *Permanent Magnets 2010-2020* is now in print. Along with my co-authors, Walt Benecki and Terry Clagett, this was our labor of love

for the past 10 months. We appreciate the many pre-publication orders received from companies all over the world, thus far. More information about this comprehensive industry overview can be obtained by contacting any of the authors.

And just in case you missed the press release, since the beginning of October, I have re-joined Molycorp as a fulltime employee. Molycorp's strategy is to supply rare earths from "mine to magnets." I will be responsible for the metals and magnets part of the business. I'll have more to say about building the next and probably last magnet factory in the US in a future article.



Samarium oxide and metal prices for the last 12 months, courtesy of Dirk Hemelings at Metal Pages.



The attendees of the Rare Earth Magnet workshop in Bled, Slovenia. Photo courtesy of Sanja Fidler



Dr. Stan Trout has more than 30 years experience in the permanent magnet and rare earth industries. Dr. Trout has a B.S. in Physics from Lafayette College and a Ph.D. in Metallurgy and Materials Science from the University of Pennsylvania. Stan is a contributing columnist for *Magnetics Business and Technology* magazine and the Director of the Magnet Business for Molycorp Minerals, LLC. *Spontaneous Materials*, his consultancy, specializes in technical training on magnetics. He can be reached at strout@ieee.org.

Attend Stan's pre-conference workshop at
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