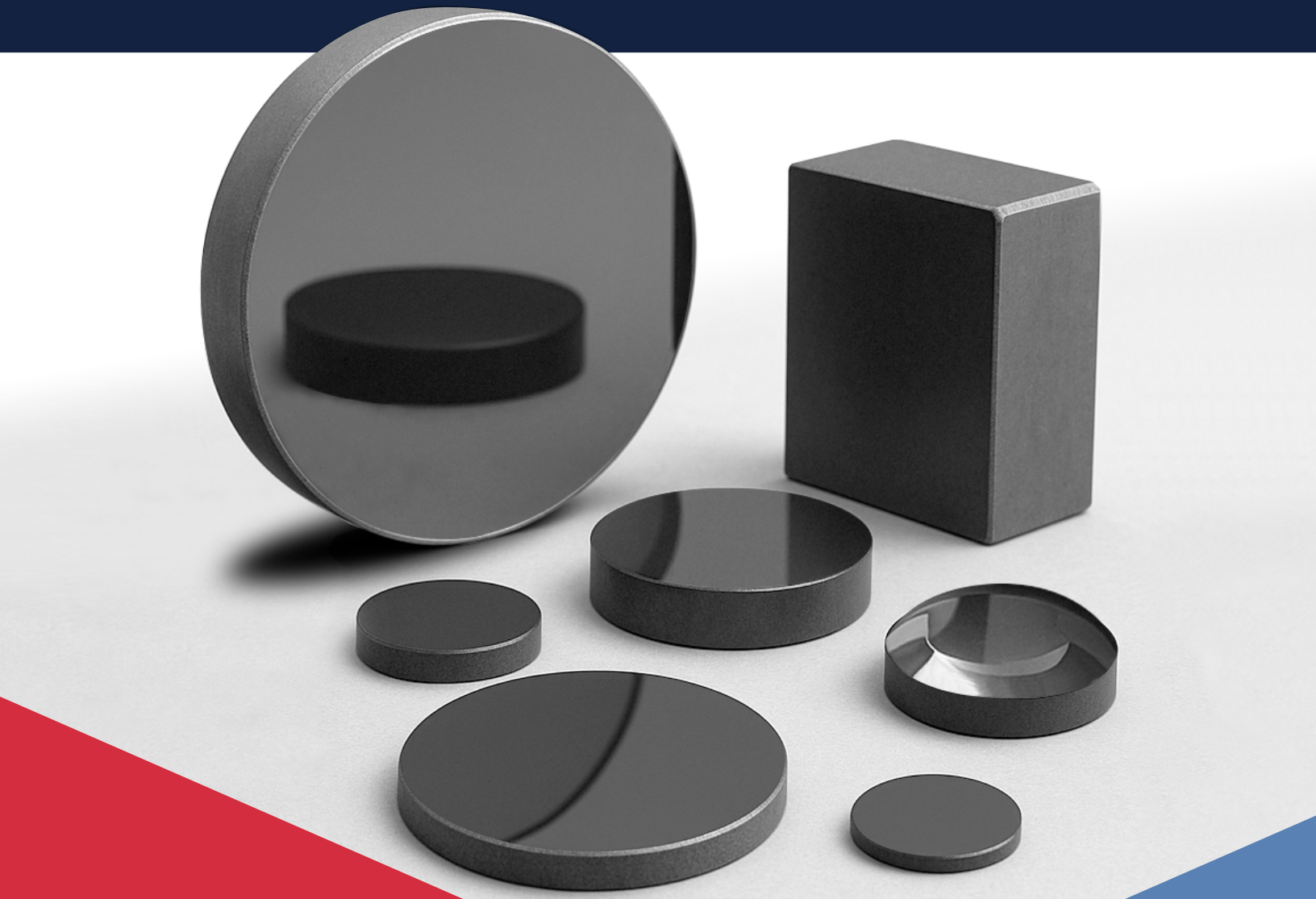
RECYCLING GERMANIUM:

A Temporary Fix Amid Trade Tensions



APOMA

AMERICAN
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ASSOCIATION

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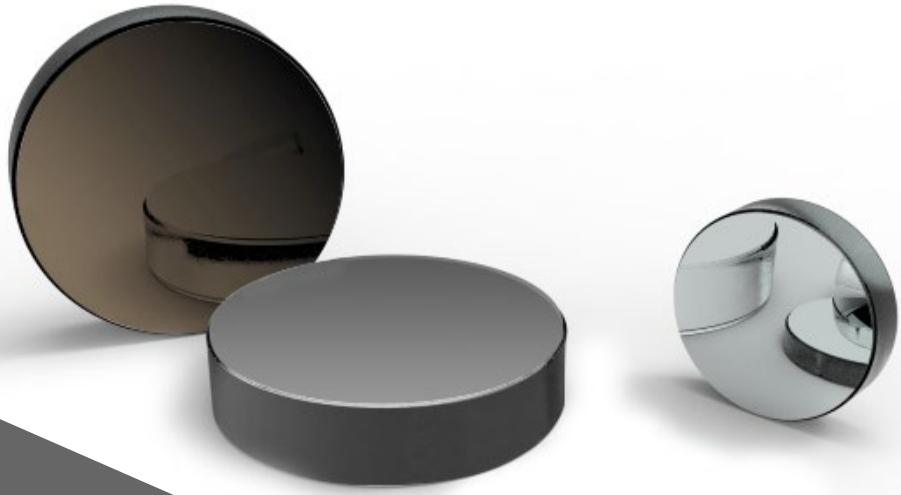


As global demand for high-performance optics, semiconductors, and infrared technologies surges, the spotlight is once again on germanium—a rare element with critical industrial uses and a supply chain tangled in geopolitical uncertainty.

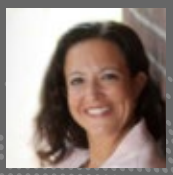
In response to tightening export controls and escalating trade tensions, particularly with China, recycling germanium from industrial scrap and end-of-life components has emerged as a stopgap solution.

But while recycling may help bridge short-term supply gaps, it's no silver bullet. With primary production still heavily concentrated in politically sensitive regions, the long-term stability of the germanium supply chain will depend on policy shifts, diversification of sources, and strategic cooperation far beyond the scrap heap.

APOMA has joined the effort. The American Precision Optics Manufacturers Association is stepping up to represent the precision optics industry, driving political awareness and advocating for stronger domestic sourcing of critical materials like germanium.

At the forefront of this movement is Jason Hess of E.R. Precision Optical, whose work in recycling germanium scrap and rejects has become a cornerstone example of how U.S. manufacturers can build more resilient, self-reliant supply chains.

Read on as Yvette Pagano and Lee Steneken sit down with Jason Hess to discuss how E.R. Precision Optical is shaping the germanium landscape.



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LEE: Thank you for taking the time to talk with us about one of the biggest challenges facing the optics industry—germanium. It's been at the center of countless conversations, and we're all grappling with how to access or replace it. We're hoping you can shed some light on the situation and share your perspective on possible solutions. To start, why is germanium so critical in precision optical applications?

JASON: That's a great question. Germanium has a unique combination of optical, thermal, and mechanical properties, especially for infrared applications. It transmits light in the 2–14 micron range, which is essential for many military and thermal imaging systems. It also traps heat more effectively than other materials operating in the infrared spectrum, making it ideal for these uses.

LEE: If it's so important, why is it so difficult to get?

JASON: Germanium is a rare element, mainly produced as a byproduct of zinc mining. It's not commonly found in concentrated deposits. A few countries—Russia, Canada, Belgium—produce small amounts, but China dominates the market, mining and refining at least 70% of the world's supply. Beyond the obvious geopolitical tensions, Chinese export controls and strategic stockpiling have severely constrained availability.

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YVETTE: Are there any alternative materials that can fill the same role?

JASON: Unfortunately, there's nothing that performs exactly like germanium, especially at higher wavelengths required for thermal imaging. Chalcogenide glass and silicon are options, but they cut off at about 12 microns and 5 microns, respectively. Even chalcogenide glass relies on small amounts of raw germanium, so its availability is indirectly tied to the same supply issues.

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YVETTE: So where does that leave us? How can the industry keep critical projects moving?

JASON: With limited supply and the environmental impact of refining germanium domestically, I believe recycling is currently the fastest and most practical option.

LEE: How does the recycling process work?

JASON: At E.R. Precision, we have an NRC license to handle, control, and refine germanium, even if there is a presence of ThF2 in the older coated optics. We process existing components or scrap material into new, usable raw material. We grow crystals and ingots right here in our Florida facility. However, any recycling or growth still requires some raw germanium that is free of dopants. We're in the process of commissioning a zone refiner that will help remove unwanted dopants from spent material and allow us to recover higher-purity germanium for reuse.

LEE: How large of an ingot are you able to produce?

JASON: Currently, we have three crystal growers that can pull ingots up to 7 inches in diameter. We are adding a fourth crystal grower/puller that will be online by the end of Q3. Once it's operational, we'll be able to pull ingot diameters as large as 12.5 inches. We also offer custom diameters to improve manufacturing efficiency and reduce customer costs. After growing the ingots, we slice them into pucks and can machine them to custom radii as needed.

LEE: What's the timeline for the relating to the zone refiner?

JASON: When everything is running smoothly, we can produce up to 200 kilograms of material per week. But even that falls far short of meeting total industry demand. Recycling is a strong short-term strategy, but it isn't sustainable as a long-term solution on its own.

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YVETTE: What does a long-term solution look like?

JASON: That's the big question. With Chinese export restrictions, and limited new raw material, it's essential to establish domestic capabilities. We know there are large reserves of germanium dioxide powder in Canada, but neither Canada nor the U.S. currently has infrastructure to convert that powder into large-scale, low-purity metal. Even with Canada's powder inventory, the investment associated to start processing it into metal isn't justifiable. If we could secure that low-purity feedstock, E.R. Precision could refine it further to meet optical-grade requirements.

YVETTE: If the powder is available, why hasn't the conversion process been developed here?

JASON: Mainly because it's extremely costly and there are environmental concerns to manage. These are real challenges, but not impossible to overcome. In March of this year, President Trump issued Executive Order 14241 to support domestic mining and development of rare earth elements, including germanium. From what we understand, the government recognizes the urgency of securing these materials for defense applications.

LEE: That sounds promising. What's the status of those efforts?

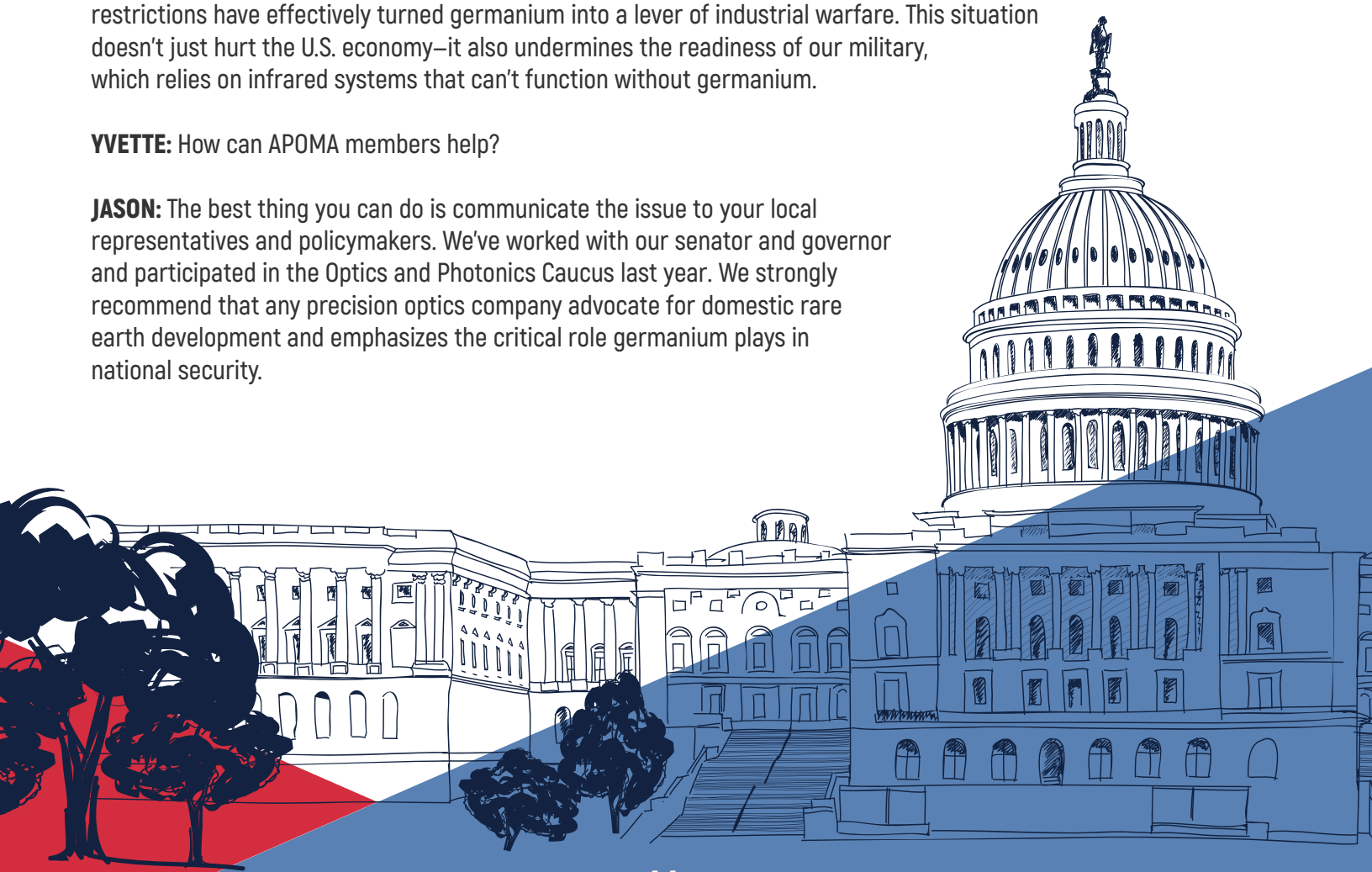
JASON: Honestly, we don't know. The Executive Order is a good first step, but until concrete action is taken, it's just a piece of paper. We've reached out to our local representatives for updates but haven't received much information. Realistically, it could take years to see any impact. In the meantime, E.R. Precision will continue expanding our refining capacity and recycling operations.

LEE: Has the industry ever faced a shortage like this before?

JASON: There have been price swings, but never anything this prolonged. We're coming up on two years of constrained supply. Initially, we thought it would last a few months, but China's export restrictions have effectively turned germanium into a lever of industrial warfare. This situation doesn't just hurt the U.S. economy—it also undermines the readiness of our military, which relies on infrared systems that can't function without germanium.

YVETTE: How can APOMA members help?

JASON: The best thing you can do is communicate the issue to your local representatives and policymakers. We've worked with our senator and governor and participated in the Optics and Photonics Caucus last year. We strongly recommend that any precision optics company advocate for domestic rare earth development and emphasizes the critical role germanium plays in national security.



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YVETTE: Agreed. More governmental advocacy and lobbying were among the top priorities APOMA members shared with me in recent surveys, and I'm happy to be the "squeaky wheel" for all APOMA members. I am partnering with Congressman Joe Morelle, Co-Chair of the **Congressional Optics and Photonics Caucus**, to help expand the caucus's membership and amplify the voice of American optics manufacturing in Washington. The more members of Congress who join, the stronger the caucus—and the greater its impact on policies that support our industry, including domestic germanium recycling. I have developed a three-part plan to reach out to members of Congress on both sides of the aisle to encourage them to join the caucus and show their commitment to American optics manufacturing. Through the caucus, APOMA will have a seat at the table to help shape policy linked to Executive Order 14241 and other critical initiatives. This September, I'll be in D.C. for the Optics and Photonics Industry Capitol Hill Days, advocating for legislation and regulatory action to strengthen our supply chain. I'll also be submitting formal public comments and requests for information to ensure APOMA members' priorities are heard. A toolkit is coming soon so you can get involved and help engage your elected officials.

JASON: That's great, Yvette. Having APOMA's support will be advantageous for the entire industry.

LEE: Jason, we appreciate your time and expertise. Is there anything else you'd like to share with our members?

JASON: I'd just emphasize that while our recycling and growth efforts are helping, they can't be the sole solution. We encourage everyone to stay engaged with policymakers, advocate for domestic capabilities, and share any updates about Executive Order 14241 with the broader industry. Germanium is irreplaceable, and we have to work together to secure a sustainable supply. I'm always available to speak with members who want to learn more.

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LEE: Hopefully a long-term solution isn't that far away. In the meantime, if someone has germanium scrap, how can we repurpose it?

JASON: E.R. Precision can recycle scrap germanium for any APOMA member. Typically, it takes about 50–60 kilograms of material to run a batch through the puller. If you have smaller quantities, we can purchase it and combine it into our next refining cycle.

YVETTE: Thank you, Jason. We appreciate your insights and look forward to hearing how your new zone refiner will expand your capacity.

LEE: This is great information, Jason. APOMA is committed to working with you and all other members to find a germanium continuity plan that makes sense for industry.

CONCLUSION

This conversation with Jason Hess underscores both the urgency and complexity of securing a reliable germanium supply for the precision optics industry. While recycling efforts like those at E.R. Precision Optical offer critical short-term relief, they alone cannot meet the scale of demand or fully shield manufacturers from geopolitical volatility. Long-term solutions will require a coordinated strategy—combining domestic refining capabilities, broader material sourcing, and sustained advocacy to ensure that policies like Executive Order 14241 move from paper to action.

As APOMA continues to raise awareness and champion legislative support, it's clear that collaboration across industry, government, and research institutions will be essential. For now, the message is simple: germanium is irreplaceable, the stakes are high, and it will take a unified effort to build a resilient supply chain capable of supporting both commercial innovation and national security.