

Protecting 'Made in America' ingenuity

GTAT's CEO **Greg Knight** argues for the US government to prevent critical SiC production equipment and process technology from being lost abroad.

On the sidelines of the on-again, off-again trade tangle between the United States and China lurks a cross-border issue that must not undermine American ingenuity and efforts to hold American-made technology manufacturing fast, states Greg Knight, president & CEO of GT Advanced Technologies of Hudson, NH, USA (which provides silicon carbide and sapphire materials as well as polysilicon products and crystal growth systems). While the US government does restrict the sale of critically important US technology companies, it does not properly restrict the sale of the underlying related production equipment and processes. America (and Europe) lost its early lead in solar, LED and polysilicon manufacturing industries to China, in part due to unrestricted sales of processing equipment. But US manufacturers and government alike must now come together to not make this mistake again and protect an emerging yet vital new US industry — silicon carbide.

The US is the undisputed global leader in the production of advanced silicon carbide (SiC), a material that will radically accelerate the transformation of the US economy. This little-known strategic asset is one of America's most important technology innovations. My company and a few other American businesses have developed the core underlying material technology to produce SiC crystal on a large scale, prior to it being sliced into wafers and fabricated into semiconductor devices. Semiconductor device manufacturers are replacing traditional silicon with SiC to boost functionality and cut cost in high-power applications. SiC enables longer-range, lower-cost electric vehicles, lesser-cost renewable energy, and more powerful, robust 5G networks. SiC is to advanced electronics what hydraulic fracturing (fracking) is to the natural gas industry, making it less costly and more productive.

SiC technology, and the related intellectual property for production, are closely guarded and protected by a combination of patents and valuable trade secrets. Silicon carbide's ingredients are simple — but the process and equipment that transform them are highly complex. If US companies that have this technology export it, they will enable other countries to do what they have before — expand on the back of easy capital and, in short order, dominate the SiC market. I should know. For the last 15 years, my company sold advanced equipment and process technology to the solar, LED and polysilicon industries, which Asia (China in particular) now dominates. And after just a few years, fueled by massive capital infusions and by copying our equipment designs, Chinese manufacturers took over these industries once dominated by the United States and Europe.

In the past, selling production equipment was GT Advanced Technologies' business model. This strategy made us a lot of money and we could make a lot more by selling SiC production equipment and process technology. However, as the chief executive, I have changed my business model and decided that, as a forward-looking company in the SiC supply chain, we must protect American-developed technology, while still supporting the best interests of our shareholders, employees and community. Let me be clear: I am for free trade and hard-fought technical and commercial competition; however, my company will no longer enable losing a US industry. Other countries must compete using their own sweat, their own technology innovation, their own dime, and see if they can keep up.

Much of the power to protect America's strategic technology assets rests with the US government — specifically CFIUS (the Committee on Foreign Investment in the United States). Last year, CFIUS blocked the sale of US-based Wolfspeed — a Cree Company that makes SiC power products and gallium nitride on silicon carbide (GaN-on-SiC) high-electron-mobility transistors (HEMTs) and monolithic microwave integrated circuits (MMICs) — to Germany's Infineon Technology, because of potential risks to national security. This followed the Obama administration's decisions to block two similar sales to Chinese buyers: LED maker LumiLEDs (a division of Holland-based electronics giant Philips) and Germany-based metal-organic chemical vapor deposition system maker Aixtron (which had a US subsidiary).

Our existing system of protecting America's critical technology falls short. The number of merger & acquisition (M&A) deals or foreign investments that are blocked is irrelevant, when all a company needs to do is to buy the underlying manufacturing equipment and process; it needn't buy the business if we allow the sale of the capital equipment, as this grants the implied rights to the technology's use. It is thus imperative that, from the jump, we prevent the sale of our intellectual know-how via manufacturing equipment sales — because the day we enable any country (China or any other) in this high-growth, strategically critical industry, is the day we will have allowed them once again to buy their way to technical parity and drive another American-birthed industry into the ground.

I cite the electric vehicle (EV) sector as just one of many industries being readied to gallop when more SiC products come to market. Here, and elsewhere, US policy makers would do well to support the fundamental 'Made in America' technology already in our hands. ■

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