VIDEO ARTICLE

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50 Years of Cast Metal Matrix Composites, and Future Opportunities

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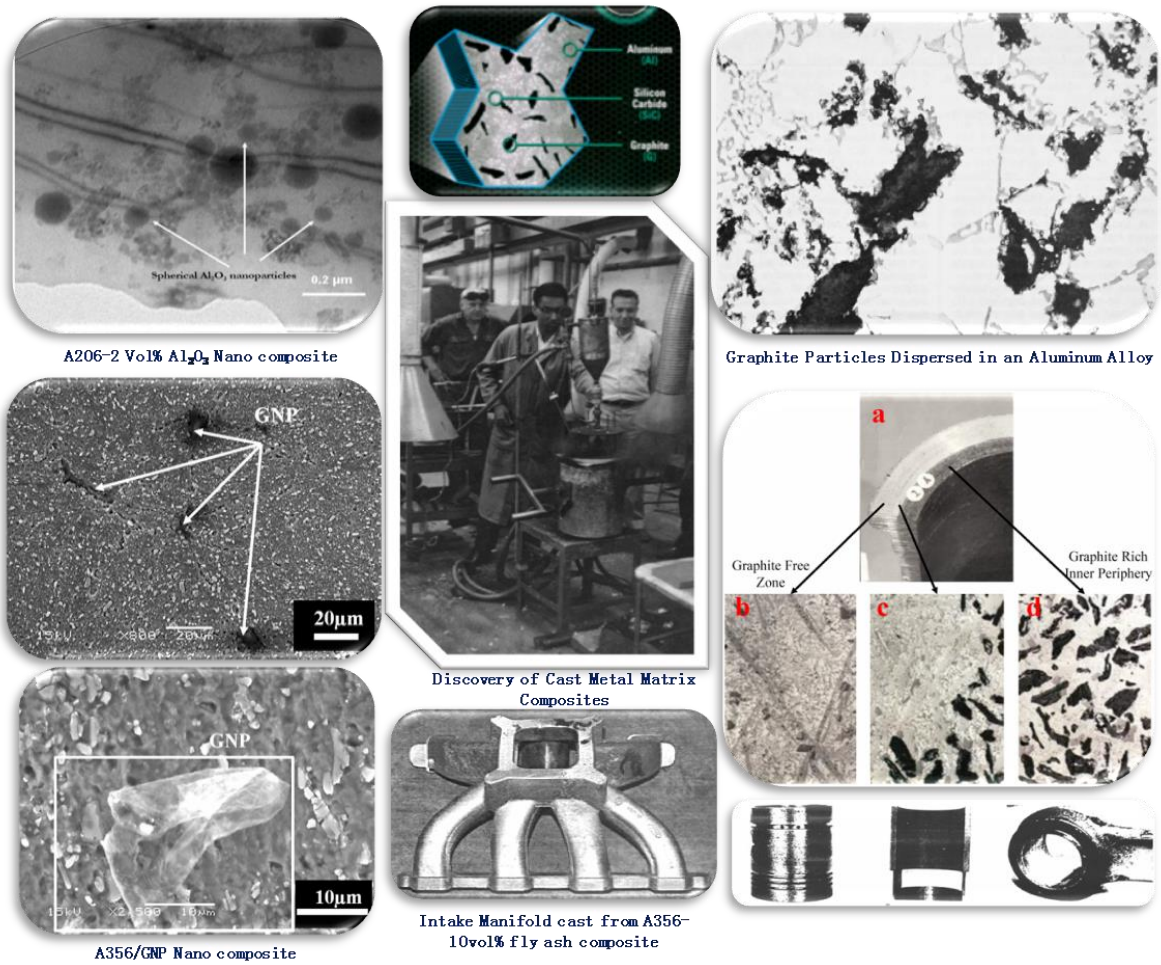
Graphical Abstract



Abstract

This webinar reviews the progress in Cast MMCs over 50 years. Property motivation and current use of MMC's components in automotive, railways, space, computer hardware, and recreational equipment are presented. The information on MMC industry including the total volume of MMC industry major producers of cast MMCs is listed. Some cast MMCs discussed include Aluminium-Graphite, Aluminium-Silicon Carbide, Aluminium-Alumina, and Aluminium-Fly Ash. Current and future directions in Cast MMCs, including the manufacture of foundry, produced Nano-Composites, functionally gradient materials, syntactic foams, self-healing, and self-lubricating composites are presented. Recent progress in the manufacture of lightweight Self-lubricating cylinder liners for compressors, piston and rotary engines in Al-Graphite and Al-Graphite-SiC composites are discussed. Future prospects of metal matrix composites are presented including fundamental issues relating to solidification processing of these materials.

Keywords: Composites; metal casting; ceramics; nano particles.

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Biography of Presenting Author

Pradeep Rohatgi received his BS in Metallurgy from IIT BHU and his Doctorate in science from MIT in 1964. He served as a professor at Indian Institute of Science, Bangalore and Indian Institute of Technology, Kanpur. He also served as the Founder, Director, and Chief Executive of two CSIR National Laboratories in Trivandrum and Bhopal in India. He serves as a Wisconsin and UWM Distinguished Professor and Director of the UWM Centers for Composites and Advanced Materials Manufacture at the University of Wisconsin, Milwaukee. He was appointed Ford Professor at UWM. He coauthored twelve books and over 380 scientific papers in Materials Science and has 20 U.S. Patents. In addition, he has over forty papers on materials policy. His initial research on Cast Metal Composites has been listed as a major landmark in the 11000-year history of Metal Casting. He has developed new lightweight composite materials to reduce energy consumption and reduce emissions. His research has been supported by NSF, DOE, Office of Naval Research, EPRI, US Army and major private sector organizations including Ford and General Motors, Alcan, and A.O. Smith on energy absorbing, self-lubricating, and self-healing materials. He has been a consultant to several private organizations, United Nations and the World Bank through

his consulting company Future Science and Technology LLC and serves as CTO of a UWM startup Intelligent Composites. He has received numerous awards for excellence in research from all over the world, and has been elected to Fellowships of twelve organizations including ASM, TMS, MRS, IOM (London), TWAS (Trieste), SAE, SME, AAAS, Wisconsin Academy, and National Academy of Inventors.

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