

14 October 2016

ASX Market Announcements

Imagine Intelligent Materials

Imagine IM and Duromer Sign MOU to Develop Graphene Anti-Static Polymers

Pacific American Coal Limited (**ASX:PAK**) is pleased to provide shareholders the latest Imagine Intelligent Materials (**Imagine IM**) update. PAK holds a 40% equity interest in Imagine IM, which forms the cornerstone of the Company's investment into technology companies. Imagine IM is focused on delivering value through the commercialisation of graphene based technologies.

The Imagine IM Market Update – includes the following highlights:

- *Imagine IM is expanding the commercialisation opportunities for graphene into thermoplastic compounds*
- *MoU signed with Duromer Group (Sydney-based Duromer Products together with Vietnamese-based DuroColour Ltd)*
- *Target market is permanent anti-static and static-dispersive coloured thermoplastics for pipes, packaging and consumer plastics*
- *Together Imagine IM and Duromer Group will deliver economically competitive static-dispersive polymers into new market verticals*

For information further on the Imagine IM Market Update, please contact:

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Imagine IM and Duromer Sign MOU to Develop Graphene Anti-Static Polymers

Sydney – 13th October
2016

Highlights

- **Imagine IM is expanding the commercialisation opportunities for graphene into thermoplastic compounds**
- **MoU signed with Duromer Group (Sydney-based Duromer Products together with Vietnamese-based DuroColour Ltd)**
- **Target market is permanent anti-static and static-dispersive coloured thermoplastics for pipes, packaging and consumer plastics**
- **Together Imagine IM and Duromer Group will deliver economically competitive static-dispersive polymers into new market verticals**

Australia's leading graphene company, Imagine IM has entered into a Memorandum of Understanding with Duromer Australia, one of the leading thermoplastic compounding companies in Asia, with a state-of-the-art operation in Vietnam (Durocolour Vietnam Ltd).

The agreement between Imagine IM and DuroColour will leverage the respective capabilities and technical knowhow of each company to integrate graphene into masterbatch materials that can be manufactured at scale, and supplied to manufacturers that injection mould or extrude polymers for use in anti-static materials.

This strategic relationship is anticipated to deliver solutions to plastic conversion businesses including:

- *Products with lower specific gravity and hence lighter weights*
- *Improved physical properties such as impact and elongation*
- *Flexibility of colourisation*
- *Lower wastage*
- *Improved manufacturing run rates*
- *Potential cost efficiencies*

Under the MOU Imagine IM will identify market opportunities with Duromer and Durocolour to develop and supply functionalized graphene concentrates that enable manufacture of coloured conductive and antistatic thermoplastic materials. Delivering permanent anti-static capabilities through masterbatch concentrates is an ideal way to deliver graphene's functionality into manufacturing applications where polymers are the material of choice. Graphene is uniquely positioned to minimise the impact on the physical properties of the polymer, both in-process and in-use, than traditional solutions and allows permanent anti-static capabilities in coloured thermoplastics.

Andrew Stewart, Director of DuroColour Australia and General Manager of Duromer Products, said, "We have been investigating the potential of graphene in polymers for several years. Now that Imagine IM has a commercial scale plant with capacity in the tonnes and the ability to meet the high volume supply requirements of industry, we feel the time is right to move into a leadership position in terms of offering graphene-enhanced polymers to industry. DuroColour's masterbatch plant and operations in Vietnam opened for business in November 2015 and serves a growing number of customers in Australia, China

and South East Asia. We believe there is a tremendous potential for materials with anti-static properties (as well as other incredible properties provided by graphene) for electronics packaging & mining applications as well as other markets. We also believe that Imagine IM's licensing and certification model offers us and our customers product differentiation and quality assurance to a level that is critical for industry acceptance".

Chris Gilbey, CEO of Imagine IM said, "Over the last 18 months our focus has been primarily on the global geosynthetics industry and developing conductive coatings that will make leak detection in geotextiles both simple to use and economically logical. This has required a tremendous amount of R&D effort, and through that we have developed considerable in-house expertise in coating polymers with graphene. We are now ready to explore even more valuable markets. For us, the agreement with Duromer Group is a logical step. They have deep technical expertise, applications knowledge and manufacturing capacity. I see this agreement opening up valuable new markets for Imagine IM in Australia and South East Asia and believe that together we will present a synergistic value proposition to global supply chains."

Jeremy Paton, Co-Director of Duromer Products and DuroColour said, "We are aware of a need for a solution to permanent anti-static and conductive polymers without the need for heavy loadings of carbon black which is highly detrimental to polymer properties. Other migratory and chemical additives are either transient or just don't give the right bang for your buck. We are in a unique position to service the markets for packaging and engineering compounds in the ASEAN, Australasia and China regions. Our plants are set up to compound a wide range of thermoplastic polymers including PP, PE, PC, PET, PBT, Nylon, PMMA and much more. We have designed our plant at DuroColour Vietnam to manufacture up to 3,000 Tonne of masterbatch per year and our compounding plant at Duromer Products in Australia has capacities of over 6,000 Tonnes. We are excited to be working with Chris and his team at Imagine IM to develop this exciting new range of products that has been missing from the market place.

Phil Aitchison, Head of R&D at Imagine IM said, "We have been exploring the commercial opportunities for graphene-enhanced thermoplastics with Duromer for nearly two years. The establishment of DuroColour in Vietnam has given Duromer fast-growing access into the Asian market. Our co-development of antistatic plastics using graphene provides a unique opportunity to significantly improve the performance of anti-static materials and to develop static dispersive materials for use in hazardous environments"

The major growth drivers for antistatic materials are the increasing shipments of electronics, particularly from China, Korea and Taiwan, as well as increasing levels of regulation governing bulk packaging of foodstuffs and other materials introduced by the EU with regard to bulk packaged goods. Anti-static materials are valuable in numerous other industries.

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About graphene

Graphene's discoverers were awarded the Nobel Prize in 2010. Graphene is the first two dimensional material and is classed as a "super-material" offering extremely high electrical and thermal conductivity,

hydrophobicity, strength, and impermeability to all gases. BCC Research estimates the global market for graphene products will reach \$2.1 billion by 2025, with a compound annual growth rate (CAGR) of 46.3%, driven by its use in RFIDs, smart packaging, super capacitors, composites, ITO replacement, sensors, and memory. Imagine IM stands at the forefront of the graphene revolution.

About Imagine Intelligent Materials:

Imagine IM is the leading Australian developer of graphene-based coatings for industrial textiles and fibres. It was founded in 2014 by a group of scientists led by Chris Gilbey and Phil Aitchison, with a vision to create disruptive products and solutions that use graphene. Imagine IM has developed a licensing and certification model to ensure that participants in the supply chain are required to meet a set of standards of materials quality. Imagine IM is the first company in the world to develop conductive geosynthetic materials using functionalised graphene.

About Durocolour Vietnam

DuroColour Vietnam (DCV) is a manufacturer of high quality colour and additive masterbatch concentrates for use in the Injection Molding, blow molding, Film and profile extrusion industries. DCV manufactures masterbatch on a wide range of thermoplastic concentrates including PP, PE, PC, PET, PBT, Nylon, Acetal, Polycarbonate, PMMA etc. Based in Vietnam, DCV is ideally placed to service these markets in ASEAN, China & Australasia. DCV's Directors carry over 80 years of combined experience in the plastics industry and are highly experience with technical product development. DCV is a subsidiary of Duromer Products which is a leading compounder of Engineering and Long Fibre Thermoplastic (LFT) compounds based in Australia. The board of DCV is comprised of: Brett Staples, Robert Daniel, Jeremy Paton, Wayne McDonald and Andrew Stewart.