



## Nanotechnology at work

Nanotechnology is an emerging scientific field creating materials, devices, and systems at the molecular level. By being able to work at this ultra-small scale, nanotechnology is being used to deliver innovations in industries including clean energy, environment, health and personal care, electronics, transport, construction, telecommunications, manufacturing and mining.

### Big environmental outcomes using very small particles

Very Small Particle Company (VSPC) has taken the concept of small technology developed by a small niche research organisation, into a world leading company through its unique manufacturing process which produces complex metal oxides at the nanoscale level. VSPC's primary focus is the development of LFP (Lithium Iron Phosphate) for use in safer, more environmentally friendly, rechargeable batteries for electric vehicles.

VSPC has developed a new process to produce their nanometre-sized grains of metal oxides, which provides batch-to-batch consistency, ensures product quality, and which can be made in any quantity. The combination of complexity of the oxide materials and nano-sized grains makes complex metal oxide powders unique.

#### Why complex metal oxides?

Products prepared from nanoscale complex metal oxides typically display enhanced physical, electrical, optical and mechanical properties, compared to single metal oxides.

World-wide demand for complex metal oxides is rising, for applications such as vehicle emission catalysts, industrial and petroleum catalysts, fuel cells, batteries, computer chips, electronics, and electronic displays, to name a few.

The prime focus of VSPC in recent times has been the production of nanoscale lithium iron phosphate (LFP -  $\text{LiFePO}_4$ ) material for use in the latest generation of rechargeable batteries for consumer electronics, and all types of electrically powered vehicles. VSPC is one of the few companies in the world currently able to make these materials at the nanoscale.

Current rechargeable lithium ion batteries use lithium cobalt oxide, which is toxic and unstable at high temperatures. By comparison, lithium iron phosphate batteries are cheaper to produce, non-toxic, have fast charge times, high power density and can tolerate extreme conditions. With the ability to manufacture nanotechnology products which have never existed before, VSPC is in the perfect position to deliver world-wide environmental benefits, and influence the development of materials technology into the future.

#### Why electric car batteries?

The use of LFP for Hybrid Electric Vehicles (HEV) is the first priority product. The drive towards electrification of passenger vehicles is twofold. The first is driven by sustainability issues and the limited global supply of oil. The second is driven by climate change and concerns over air pollution and greenhouse gas emissions. A battery electric vehicle has zero fossil fuel consumption, and depending on the source of the electricity, will reduce greenhouse gas emissions by up to 90% or even 100% if renewable sources such as solar or wind power is used.



### ABOUT VSPC

VSPC Ltd is an Australian based materials technology company that has developed a unique manufacturing process which produces complex metal oxides at the nanoscale level

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