

## A SOLID GRIP ON INNOVATION

It might seem like a truism to state that innovation is key in sports equipment development, but it's one of the consumer-facing industries in which genuine innovation is absolutely necessary for success – all the time. And since sports, fitness, leisure and wellness together make up one of the most progressive and high-value consumer markets in the world, they're often testing grounds for the most cutting-edge, performance-focused products and materials.

Because innovation is an integral part of product development and business success within these markets, setting new benchmarks is a way of life for the people who work in them – just like it is for the athletes who use the products. Increased improvements in equipment performance leads to directly increased improvements in the performance of those using them. Because of this, and in order to adapt to consumers' increasingly high demands, companies need to keep making better products.

This is where the Upsalite® materials technology platform from Disruptive Materials comes in. It's a high-performance substance with a highly specific use: a patented mesoporous magnesium carbonate, amorphous, extremely porous, and, as

a result, outstanding at moisture absorption and management. These properties of absorption add a distinct performance advantage to climbing and sports chalk products in terms of grip, far outperforming other chalk ingredients as well as providing other distinct advantages in terms of ease of application and longevity.

### Introducing the platform

The Upsalite materials technology platform, developed at Uppsala University in Sweden, has a few defining properties that sets it apart from other, similar materials – specifically, in this case, those used in standard sports chinks. Thanks to its highly porous structure and very large surface area – up to 800 m<sup>2</sup> per gram, equivalent to 2-3 tennis courts – it can absorb in excess of 10 times more moisture than regular magnesium carbonate. And its unique, extremely narrow pore structure – with pores smaller than 10 nanometres in diameter – is one of the key properties that gives it these outstanding properties of moisture control.

Since it is able to absorb more moisture than other chinks, while remaining dry for much longer, it is far better at durable moisture management and exhibits a marked improvement in performance as a result.



### Get a good grip

Generally speaking, sports and climbing chanks are essential for increasing friction between fingers and the counter surfaces, e.g. rock walls or a weightlifting bar. They come in a number of varieties – block, liquid, and powder or “loose” chanks. And they have an effect: this graph shows the increase in friction coefficient when liquid and loose chanks are applied to a climber’s hands, compared to bare fingers (Figure 1).

Grip is directly affected by moisture – mainly, sweat – on the hands, lubricating both the particles of the chalk and the surface of the skin. Sports grade Upsalite is so absorbent that it traps unprecedentedly high levels of moisture, remaining dry and a powder with a moisture absorption level of up to 90 wt%. Sports and climbing chanks made with it are therefore placed ahead of the field in terms of the improvement in grip performance, as a result – as this following picture demonstrates (Figure 2).

In general, chalk products that contain only 10% of sports grade Upsalite have been shown to absorb 2 times more moisture than similar products without the material. This is the case both for liquid chalk and loose chalk (Figure 3).

And the more sports grade Upsalite that is added to a product, the more its moisture absorption increases. While chanks made with 10% sports grade Upsalite absorb twice the amount of moisture as those made without, this amount climbs steadily as more is added. For example: a chalk that is composed of 90% Upsalite can absorb more than ten times the amount of moisture as one made without it.

Additionally, like other sports/climbing chanks, the particles of sports grade Upsalite “fill in” the structure of the skin on the finger, increasing contact surface area and – as a result – friction (Figure 4).

But it’s the material’s moisture management properties that really set it apart – that, and the fact that it continues to absorb more moisture, for far longer, than similar products.

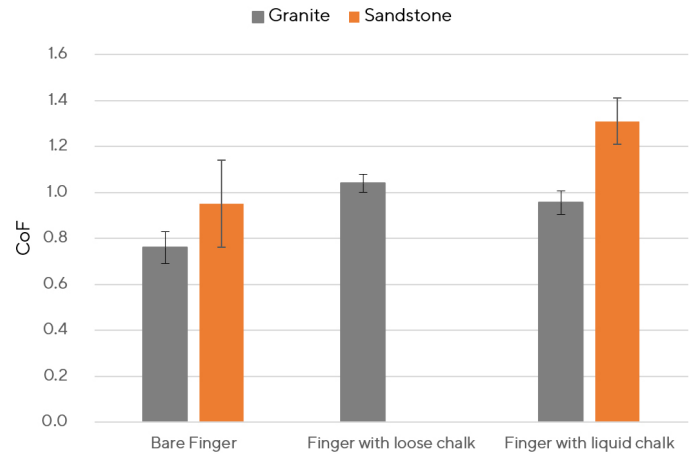


Figure 1 - Graph showing increase in friction coefficient between bare fingers and fingers with sports chalk applied, on different climbing surfaces. Source: Data on file.

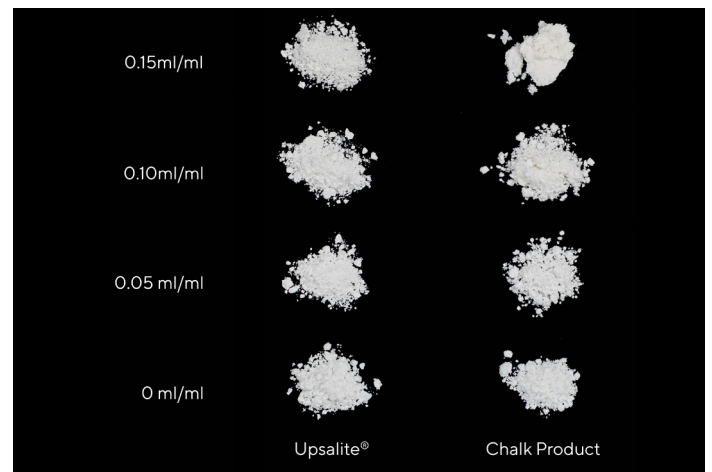


Figure 2 - The water uptake properties of Upsalite and a high-end benchmark climbing chalk visualized. Upsalite is still a powder at a water-powder ratio of 0.15 ml/ml, equal to 90 wt.%, whereas the chalk is a paste.

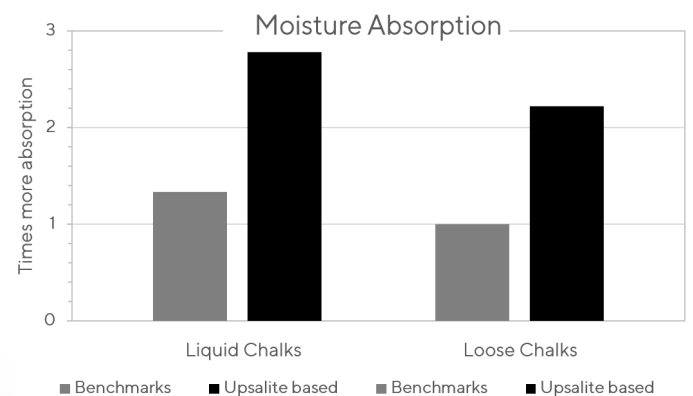


Figure 3 - Moisture absorption of climbing chanks with 10% sports grade Upsalite added – vs. benchmark (10 market-leading products) without. Source: Data on file.



### Longevity – beating the competitors

Products containing sports grade Upsalite as an ingredient are also long-lasting when applied to the skin, meaning that a little goes a long way. Chalks containing sports grade Upsalite have been shown to steadily absorb more moisture over time than premium competitive products.

Furthermore, in a CrossFit user survey conducted in Sweden by Disruptive Materials, around 90% of users stated that climbing chalk products containing the material were longer-lasting than competitors’ products. It requires less re-application, as well as smaller amounts in the first place, and as a result it reduces consumption and increases efficiency.

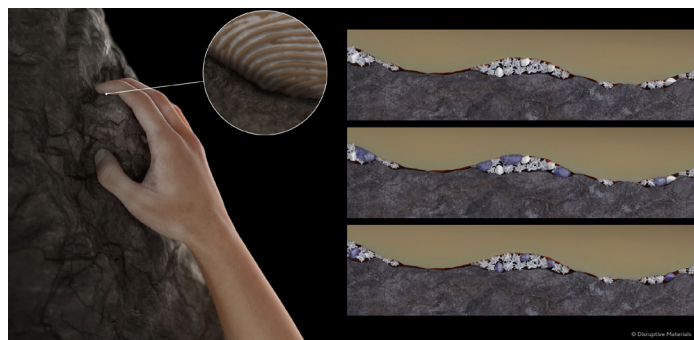


Figure 4 - How sports chalk particles increase the surface area of the finger.

### Cleanliness and sustainability

In outdoors sports, sustainability is a subject that’s always close to home. Across the whole industry, there’s a strong desire to take care of the natural environments that provide enthusiasts with so much enjoyment. Awareness of sustainable issues and “cleanliness” in products is high. Importantly, sports grade Upsalite is manufactured to be devoid of harmful or poisonous impurities. It is derived from brine and synthesized without water consumption, as well as being non-toxic and lab-tested to show that it’s good for the wearer’s skin. It is not mined like most chalks are, and it has been shown to contain far lower trace levels of certain heavy metals than are currently permitted by the EU and the US (Figure 5).

	<b>Pb</b>	<b>As</b>	<b>Hg</b>	<b>Cr</b>	<b>Ni</b>	<b>Zn</b>	<b>Cu</b>	<b>Ba</b>	<b>Cd</b>	<b>Co</b>	<b>Sb</b>	<b>Se</b>
Upsalite® C101	≤0.5	≤0.5	≤0.1	≤10.0	≤5.0	-	-	-	≤0.1	≤3.0	≤0.5	-
EU - E172	≤10	≤3	≤1	≤100	≤200	≤100	≤50	-	≤1	-	-	-
US - 21CFR	≤10	≤3	≤1	-	-	-	-	-	-	-	-	-

Table 5 - Quantities of traces of heavy metals found in the Upsalite materials technology platform, compared to EU and US recommendations. Source: Data on file.

## Summary

Grip might seem like a relatively straightforward concept – but it's about more than just the amount of friction generated between skin and an object. As well as in climbing, grip is a factor that plays a part in other sports too – it's essential in weightlifting, high-impact strength exercises like CrossFit, and gymnastics. Improved grip even benefits other activities where participants need to hold onto things, like racket sports and field events.

Sports grade Upsalite is exceptionally versatile, as well as uniquely effective at absorbing moisture. It tackles the issue of grip on more than one front – managing moisture in ways that other materials can't, as well as increasing the surface area of the finger like standard chalks. Further benefits can be found in the fact that products containing it are easily applicable for an even, effective coating on the skin. They are also exceptionally durable and long-lasting.

Despite its close-up complexity and uniqueness, sports grade Upsalite is a simple concept in itself – a highly porous, absorbent amorphous magnesium carbonate. These characteristics lead it to perform better than other commonly used materials in its field; and this leads directly to better results for the people using it.

So in many respects, it's the essence of innovation. The kind of improvement that has the potential to change things for the better, across the board, and in this case to set benchmarks for climbing chalk products – where it's already proven itself to be effective and versatile. And these same benefits can be applied to products across the whole of the sports industry, whenever moisture management is required, and where the Upsalite materials technology platform's unique properties of absorption will be sure to deliver unparalleled levels of performance.



**Are you looking to develop benchmark-setting grip enhancement and moisture management products?**

To find out how you can benefit from sports grade Upsalite and the Upsalite materials technology platform, contact Alexander Grahn, Product Development Manager:  
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