

AN INTRODUCTION TO OPUS SCM™

The future of cement is eco-friendly



Why does the world need a new SCM?

Portland cement is responsible for 5-7% of global carbon emissions.

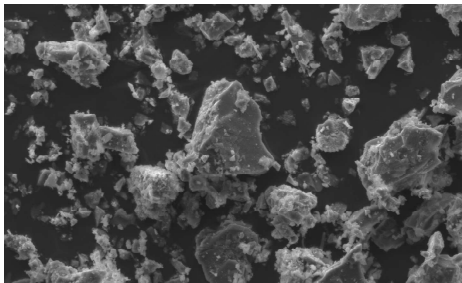
An established and easy way to improve the environmental performance of concrete is to replace part of the cement content with a Supplementary Cementitious Material (SCM) that has a lower CO₂ footprint than Portland cement.

However, **the supply of high quality SCMs is currently insufficient** and continues to decline. For example, fly ash, a by-product of burning coal in power plants, has successfully been used as an SCM for decades but due

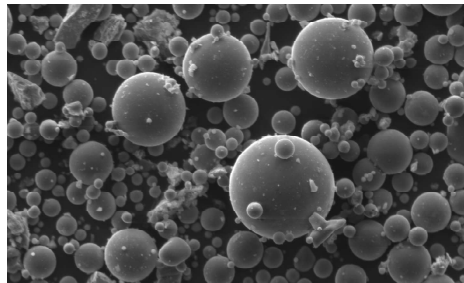
to the closure or conversion of coal- to gas-fired plants, and the use of different types of coal, fly ash suitable for use in concrete is rapidly decreasing in supply.

What is OPUS SCM™?

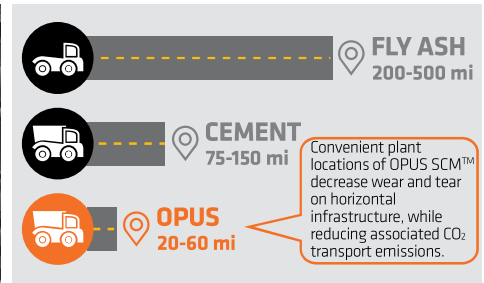
Terra is proud to introduce OPUS SCM™: an engineered SCM, that can be locally manufactured and fill the fly ash void. OPUS SCM™ offsets the use of Portland Cement in the 10-25% range for most common concrete mix designs, without sacrificing concrete performance. Terra is currently engaging in select commercial demonstration projects across the nation.



SEM image of raw feedstock at 1600x



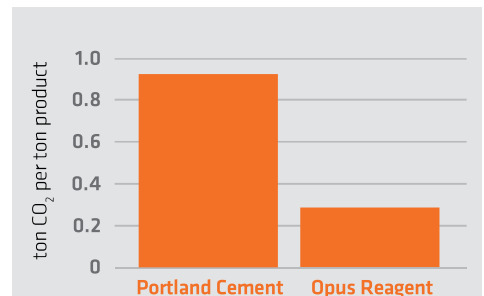
SEM image of OPUS SCM™ at 1600x



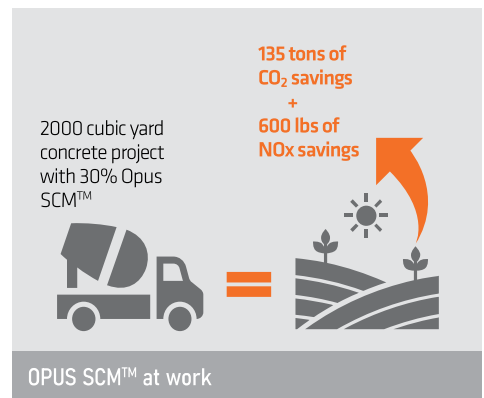
Transport emissions: State of Colorado example

What are the benefits of OPUS SCM™?

- 1. Low carbon emissions.** OPUS is made from silicate rock types that have little to no embodied CO₂ as opposed to Portland cement which is made from limestone that has over 40% embodied CO₂. For every ton of traditional Portland cement that OPUS SCM™ displaces, **70% reduction in CO₂** can be realized. In the future, **as favorable, renewable energy sources become more economical and scalable, OPUS will achieve zero carbon emissions.**
- 2. Low NOx emissions.** NOx emissions will be controlled and for every ton of Portland cement replaced by OPUS, **up to 90% reduction in NOx emissions** can be expected.
- 3. Scalable technology & globally available feedstocks.** Terra's technology is highly scalable and our feedstock, silicate rocks, are the most abundant rock type on earth, a major advantage over other technologies that are constrained to one specific feedstock type.
- 4. Cost competitiveness.** Terra delivers cost competitive solutions before green and/or government incentives.
- 5. Certified.** Terra's materials & technology have been broadly tested and verified by 3rd party certified independent labs. **OPUS SCM™ meets all applicable ASTM standards.**
- 6. Using existing infrastructure.** OPUS SCM™ functions well within existing concrete infrastructure.
- 7. Low transport cost.** Terra plants sit on small footprints allowing OPUS SCM™ to be produced close to core markets, greatly reducing transportation logistics and costs.
- 8. No coal.** OPUS SCM™ is not a by-product of burning coal.



OPUS: Low manufacturing emissions



For additional information, please contact us:

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