

Competitive Strength Built on the Relentless Pursuit of Ceramics Manufacturing Optimization

From its very beginning, the NGK Group has sought to reexamine conventional ceramics manufacturing practices in light of the latest science and technology in order to help it identify the optimal combination of process conditions for each of its products. And after nearly 100 years, this pursuit of optimization has accrued a wealth of technology and expertise from which the NGK Group draws its competitive strength.

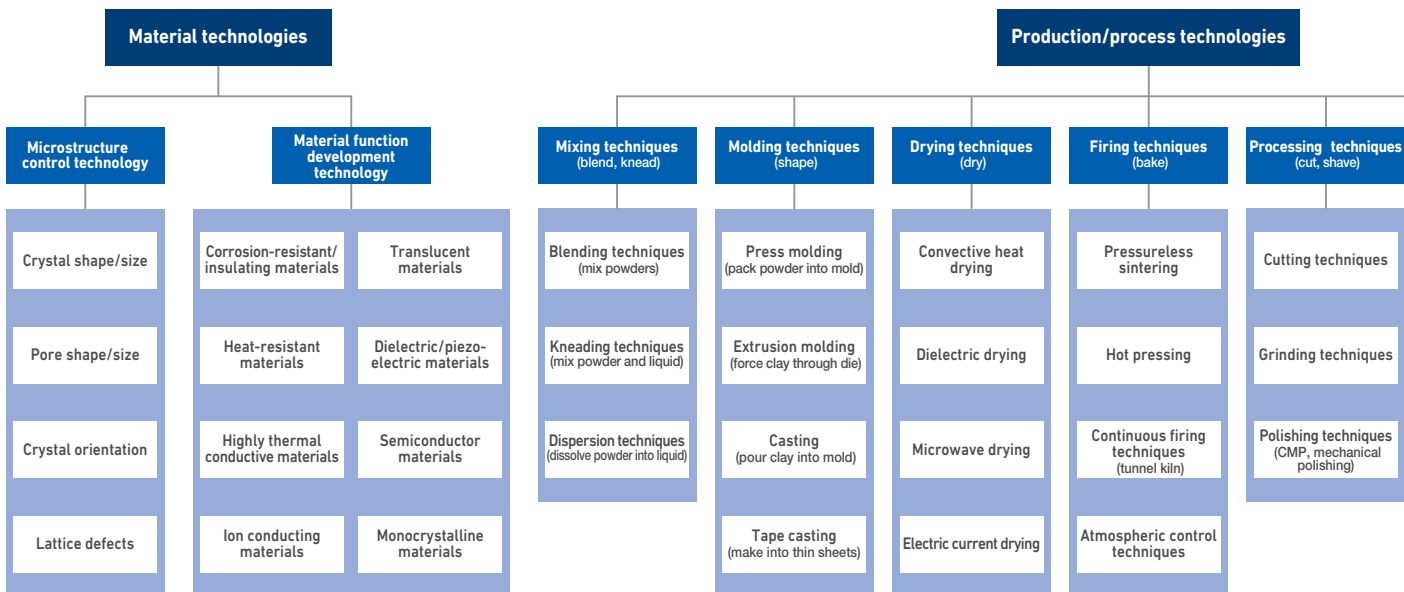
Mixing, molding, and firing. A puzzle with endless combinations.

Ceramics manufacturing is patient, methodical work, which requires you to blow life into inanimate material that is hard and brittle. You start by choosing from among tens of thousands of raw ingredients that will provide the best combination suited to your needs, and then you mix them. After you have calculated what shape your product needs to have after firing, you mold

it. Finally, you perform firing to achieve the optimal microstructure and component structure in your product.

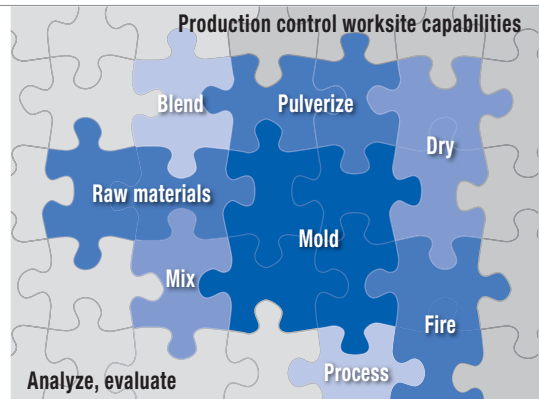
This interconnected series of processes involves an almost unlimited number of parameter combinations. Each product is like its own, complex jigsaw puzzle, and every piece is essential.

■ NGK Core Technologies



Key technology in the manufacture of the HONEYCERAM® ceramic catalytic converter substrate for automobile exhaust purification

In order to ensure product uniformity, it is essential that we perform on-site analysis, evaluation, production control, and other measures that allow us to control the production process in line with the slight variations in raw materials characteristics of each lot.



Achieving uniformity in mass production can take 10 years or more

Uniformity, i.e., little to no variation, is essential for industrial products. This is particularly true for insulators, which the NGK Group has been manufacturing since its founding. A single broken insulator will knock out the entire power transmission line; thus, strict quality control has always been necessary. As a result, the pursuit of uniformity has become embedded in the very corporate DNA of the NGK Group.

We methodically search for the optimal and most cost-efficient combination of parameters to use in the mixing, molding, firing, and other processes, and then

we steadily work to improve these to achieve uniformity in mass production. Finalizing each process takes a great deal of time; with difficult products it can take 10 years or more. At NGK, our starting point is, and has always been, an uncompromising management policy combined with methodical diligence on the job. This is the reason why NGK products—from insulators to HONEYCERAM, NOx sensors, NAS® batteries, and semiconductor manufacturing equipment products—are so far beyond anything our competitors have to offer.

