LTCC

Low Temperature Cofired Ceramics

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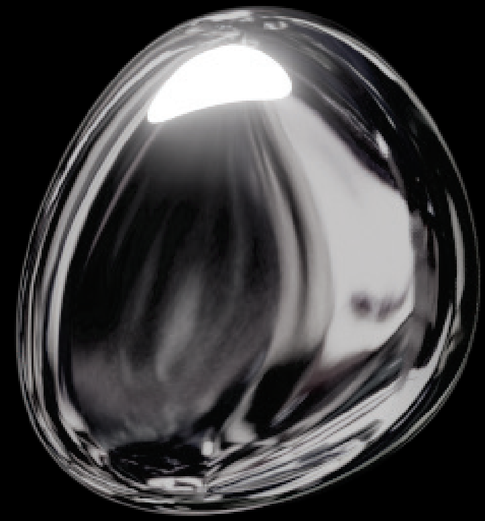
Agenda



Topics covered

What is LTCC?

Areas of application

LTCC in comparison

Layout

Production

ULTCC

LTCC and HTCC market

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LTCC

A technology for manufacturing electronic components and multilayer circuits based on sintered ceramic carriers.

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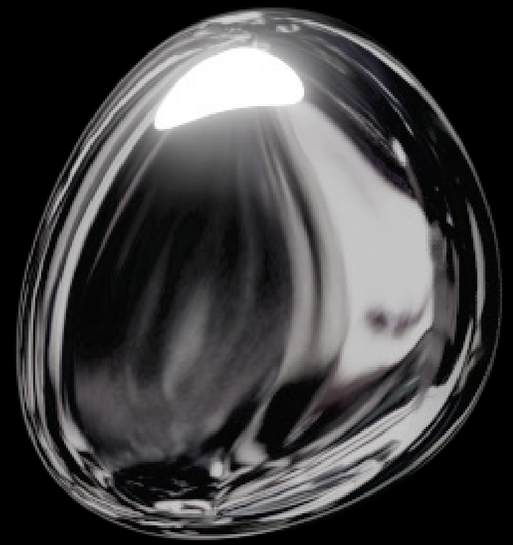
Where others reach their limits...



comes LTCC to use.

Whether in mobile communications, satellite, microsystem and medical technology or in the automotive industry (control units).

Everyday use

Perhaps you have already had LTCC in your hand without knowing it.

- In the form of an e - cigarette or in the cosmetics sector as a laser device, diffuser or air filter.

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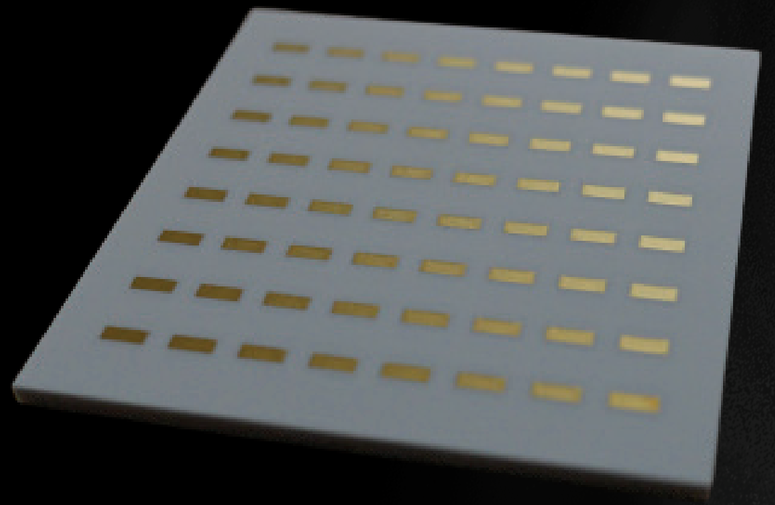
Mobile communications

LTCC is already being used in the form of AiP & antennas in the mobile communications industry.

- Especially with regard to the expansion of 5G technology



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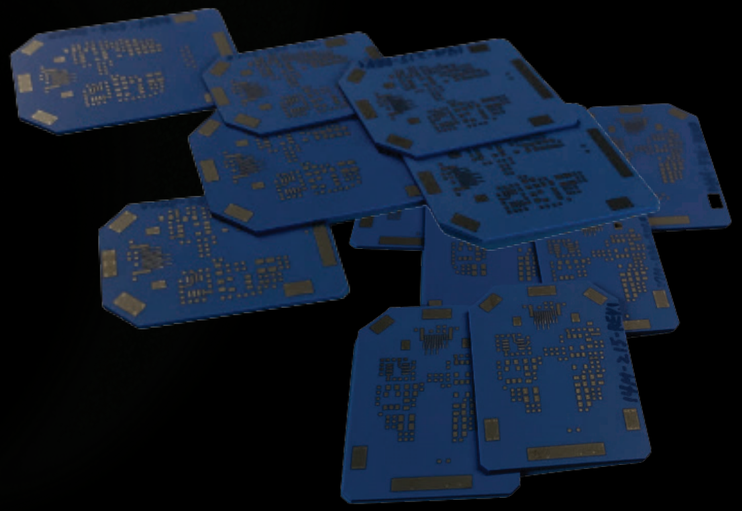
Medical



LTCC is used primarily in the medical sector in the form of blood sensors for diabetics or in X - ray equipment.

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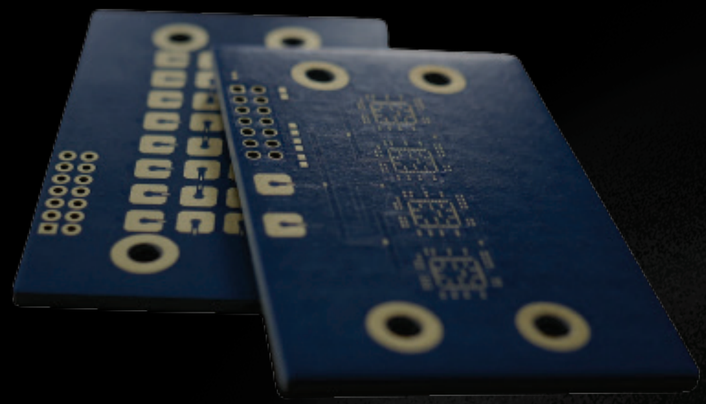
Autonomous driving

Communication between vehicles will become increasingly important in the future.

LTCC technology can be used here specifically for the communication or control of autonomous vehicles via mobile networks.



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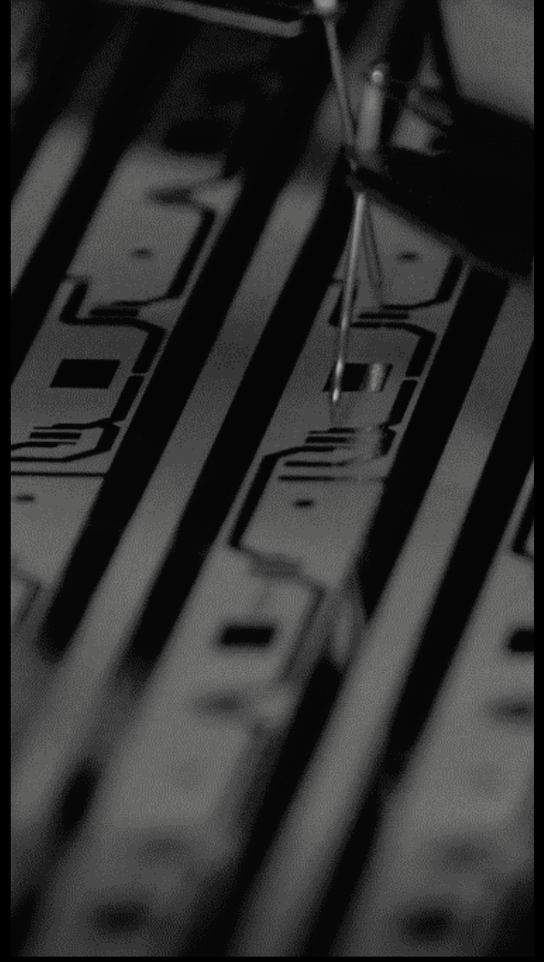
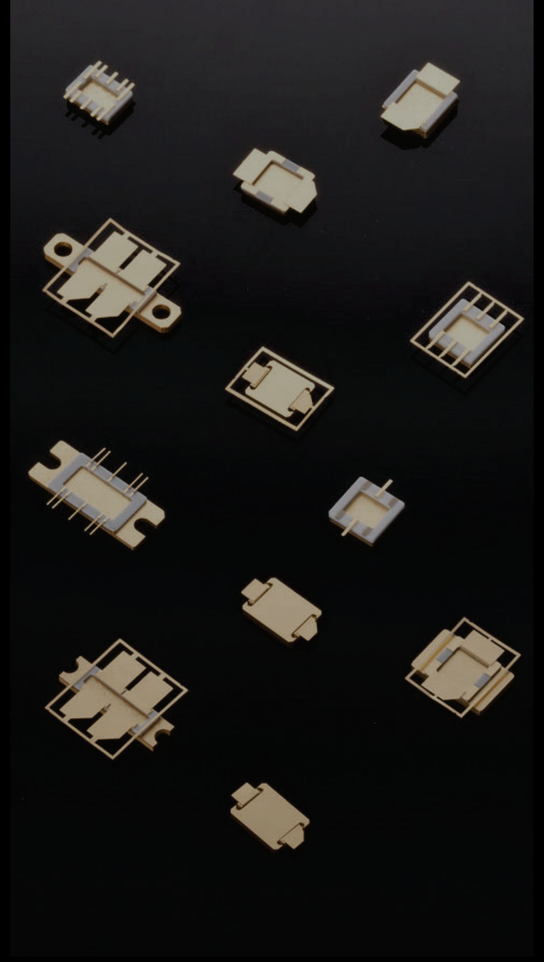
PCB, HTCC, LTCC





PCB

Can be used up to approx. 130 degrees operating temperature

HTCC

Extremely heat resistant at operating temperatures up to over 1000 Gard

LTCC

Heat resistant at operating temperatures up to approx. 300 degrees

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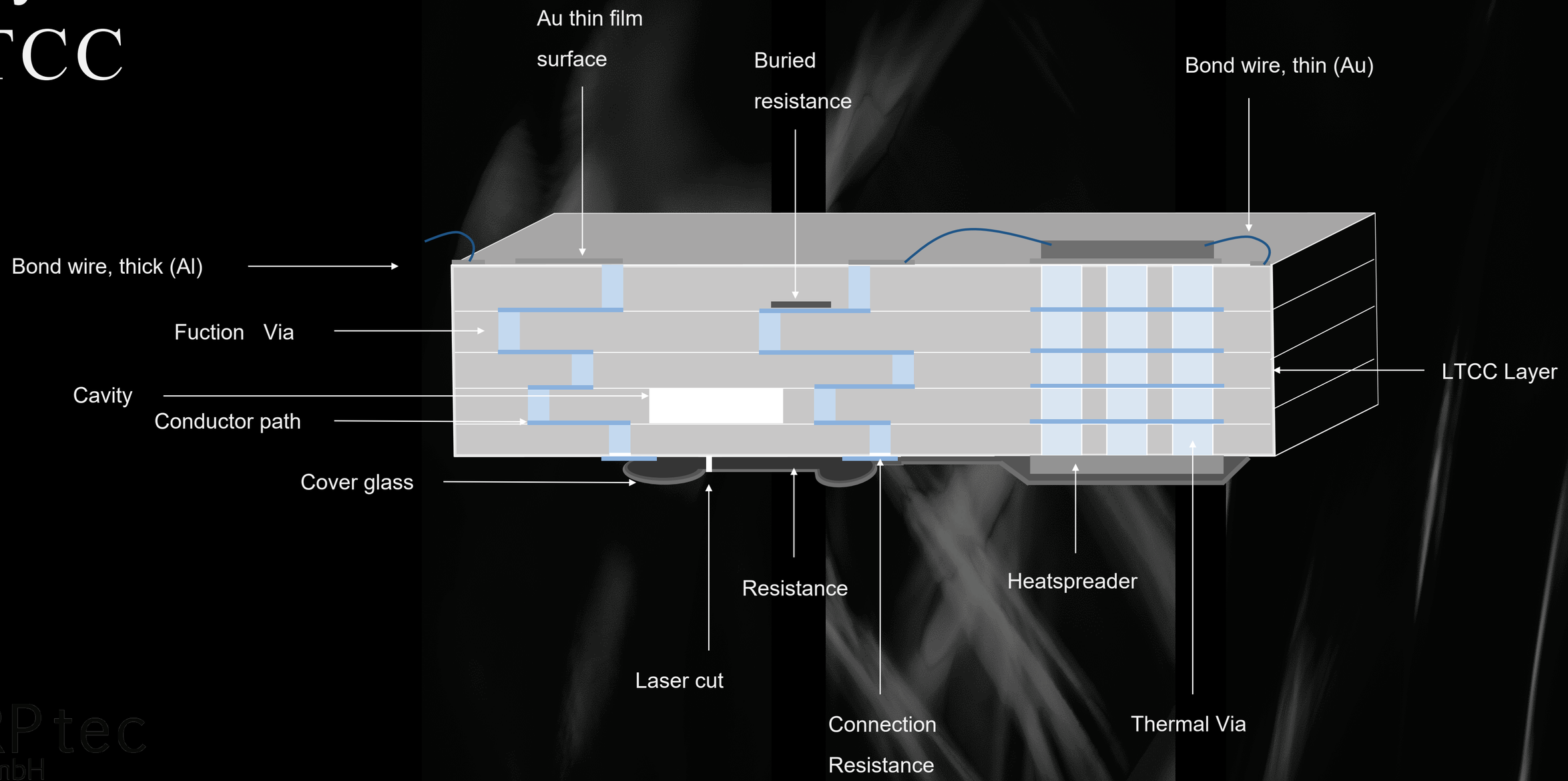
Layout LTCC



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Production LTCC

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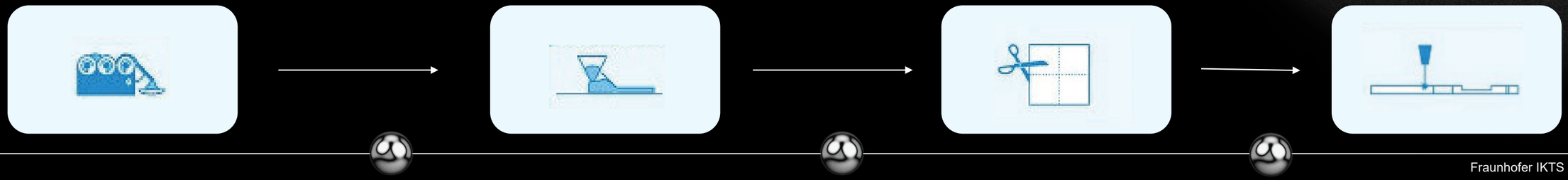
Production



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Paste production

Aluminium powder, glass powder, ceramic powder, binder and solvent are mixed.

Greentape production

Mass is poured onto a substrate film using the Doctor Blade process.

Preparation

Greentape is dried and cut to size.

Structuring

The structuring of the still unfired films is carried out with the micromachining process

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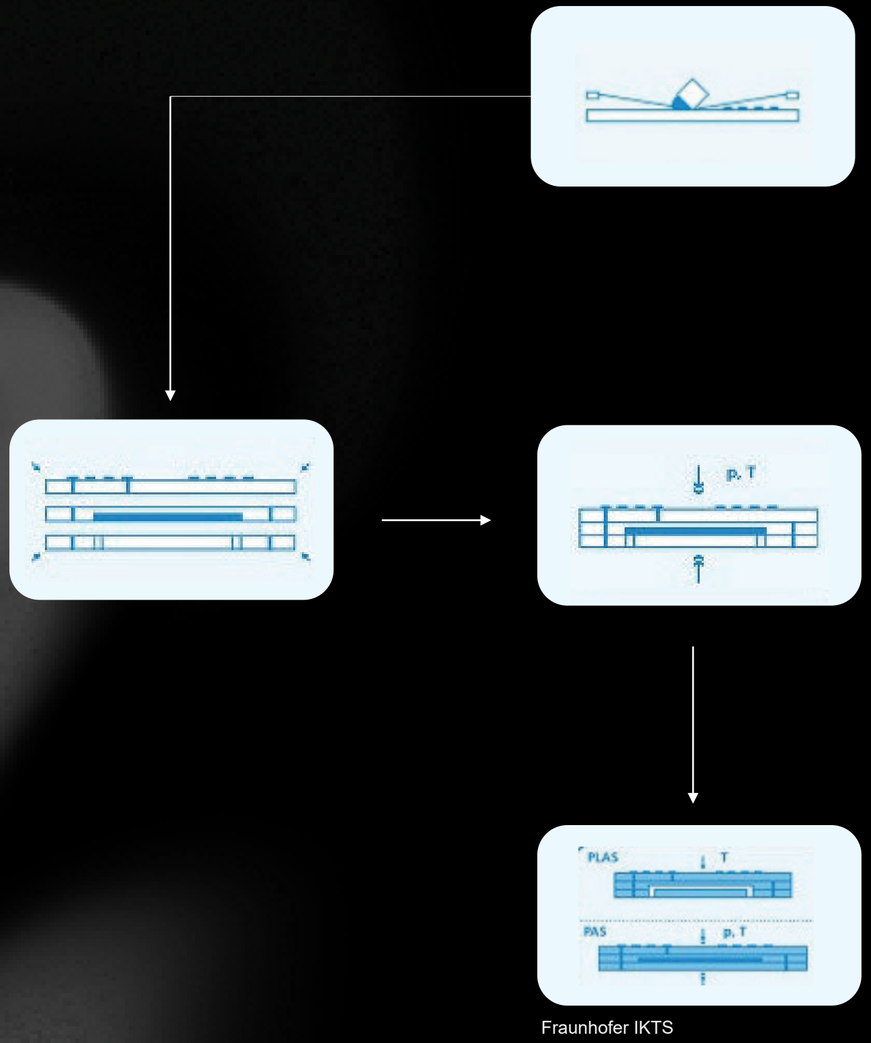

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Holes are punched in the green tape, which are then filled with a metal paste.After drying, the conductors, resistors, capacitive and inductive layers of sensory structures are printed by screen printing.

Stacking and laminating

Greentape is arranged and stacked in a compression mould . They are then laminated under heat and pressure.

Sintering

Burn - out one hour at 350 °C in the convection oven, 85% of the organic components are burnt out. The shrinkage rate is approx. 13%.

Then firing in a normal thick- film kiln at 850 °C.

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Paste production

Fine grinding of the ceramics

Mixing the paste

The ceramic powder is mixed with solvent, dispersed with the addition of suitable dispersing agents and organic binders and plasticisers are added.

Depending on the dielectric properties, the ingredients of the casting slurry vary

Processing

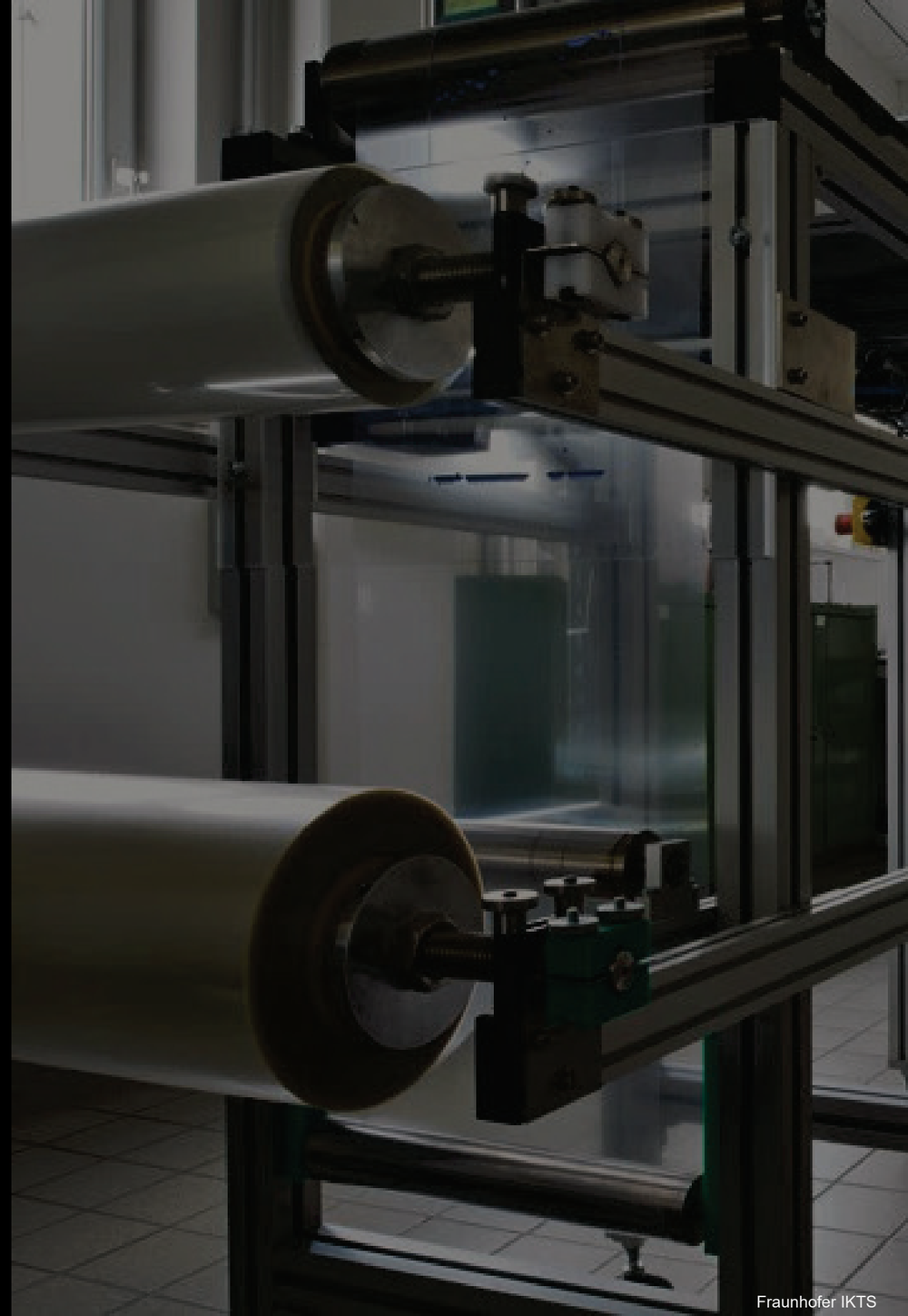
Is processed into viscous casting slurry

Greentape production

The paste is poured onto a substrate film using the Doctor Blade process. The greentape is then dried. During the drying process, the solvent is completely removed.

- The flexible, cuttable and punchable Greentape is created.

In preparation, the greentape is now cut to the required format.



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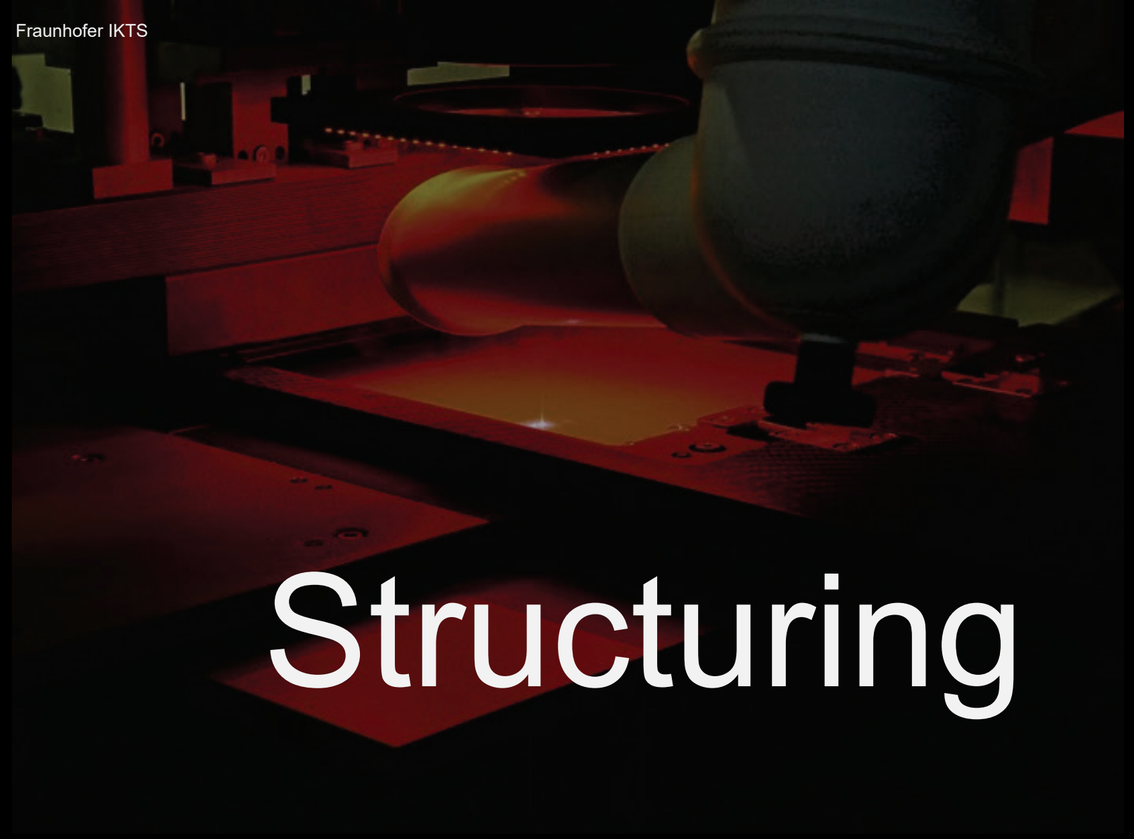

Structuring

- Micromachining processes

  The still unfired Greentape is structured using the micromachining process (punching, lasering, embossing).

- Filling the vias

- Assembly

  Screen printing of conductive tracks, resistors, capacitive and inductive layers of sensory structures

- Lamination

  Individual layers are stacked and laminated under increased temperature

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Sintering

Burning out for one hour at 350 °C in a convection oven, 85 percent of the organic components are burnt out. This produces a pore - free, monolithic ceramic. The shrinkage rate is 12.7% ± 0.3%.

Then firing in a normal thick - film kiln at between 800 °C - 900 °C .

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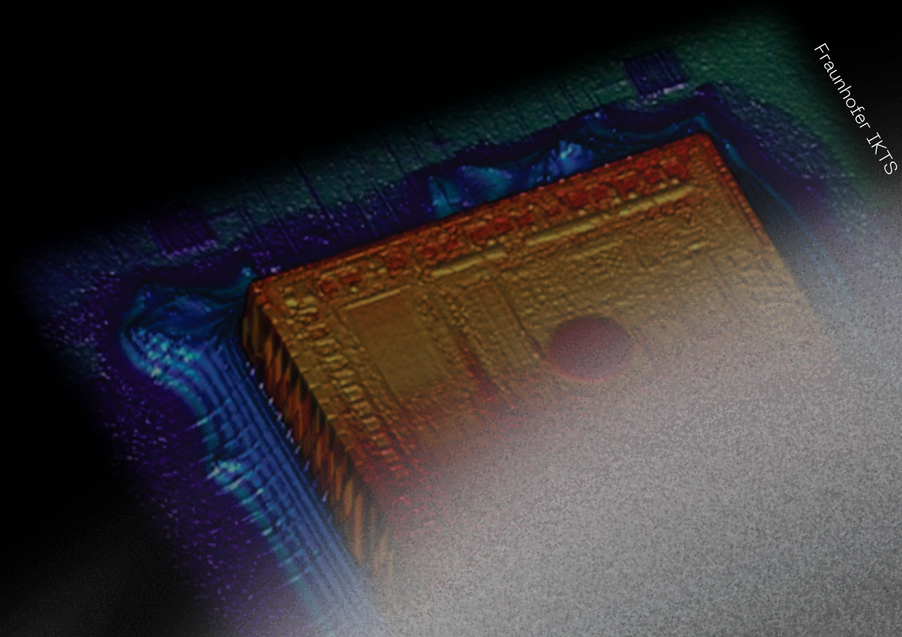
Postal processes

Other functional elements are printed on using a thick - film technique or assembled using SMT technology.



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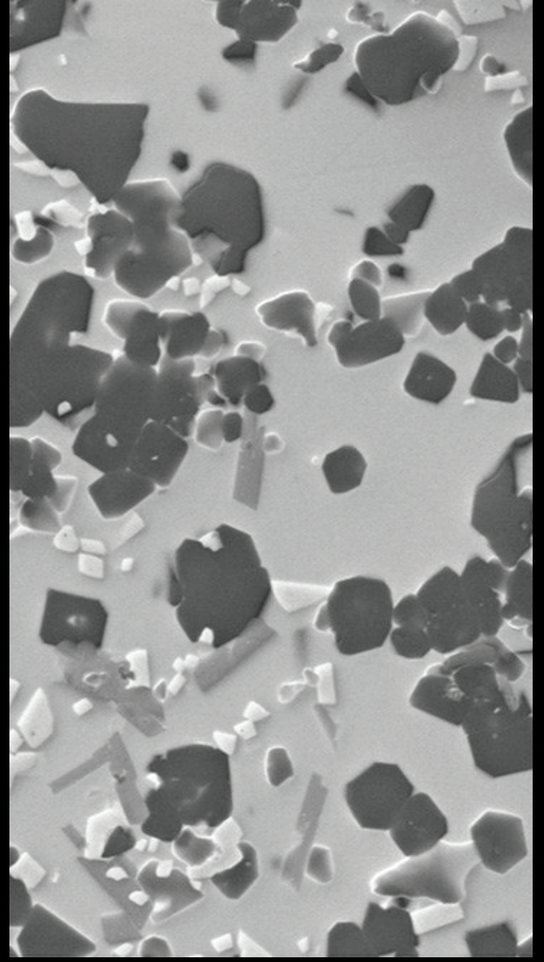
Future
-
ULTCC



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ULTCC

Multilayer, sintering at 400 to 700 degrees, energy - efficient, wider range of applications, lower manufacturing costs

Makes technology hybridisation possible, (semiconductor processes, polymer - based microcircuit manufacturing).

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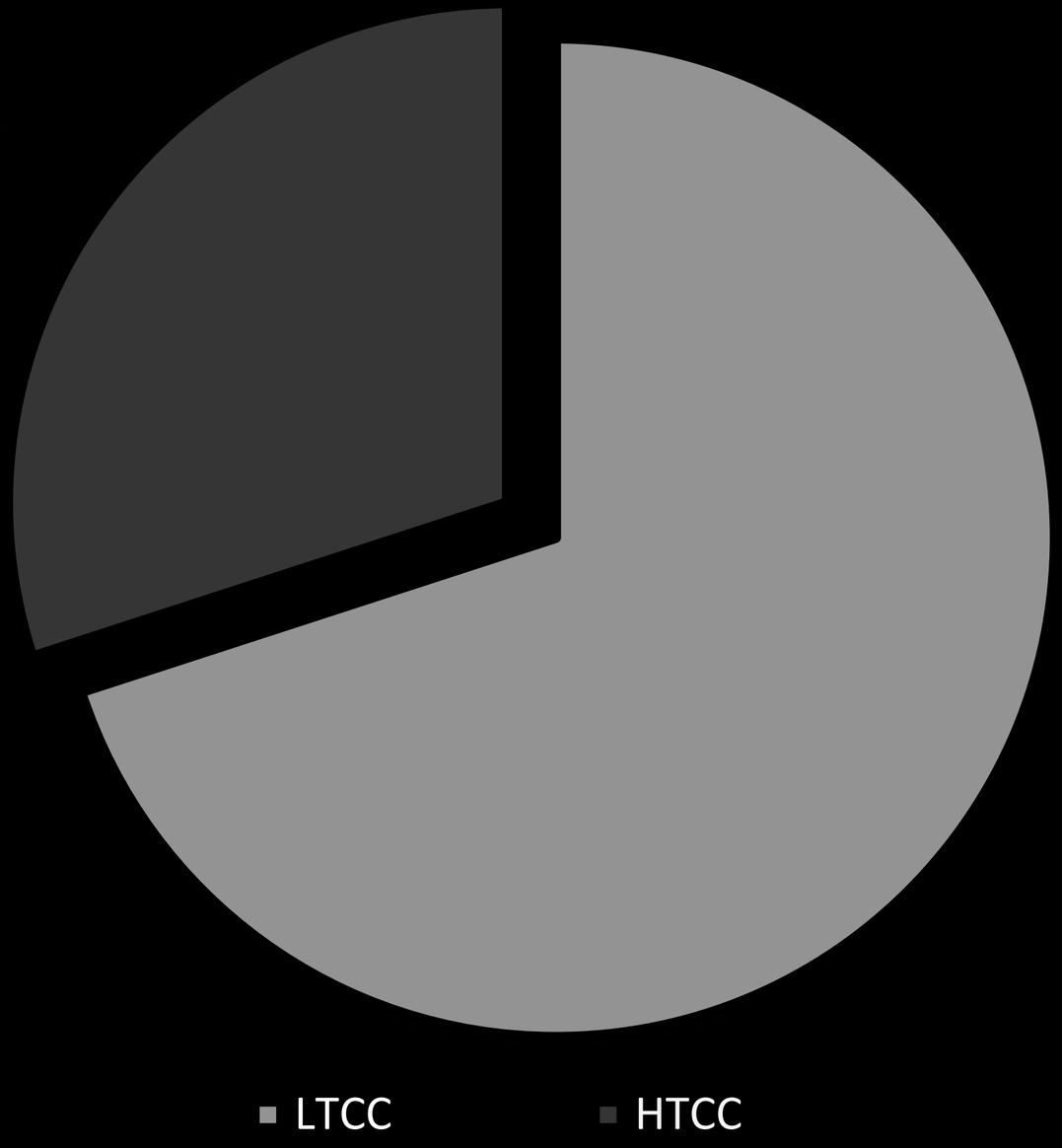
Global LTCC, HTCC Market

2.9 billion USD
Global market size,
2020



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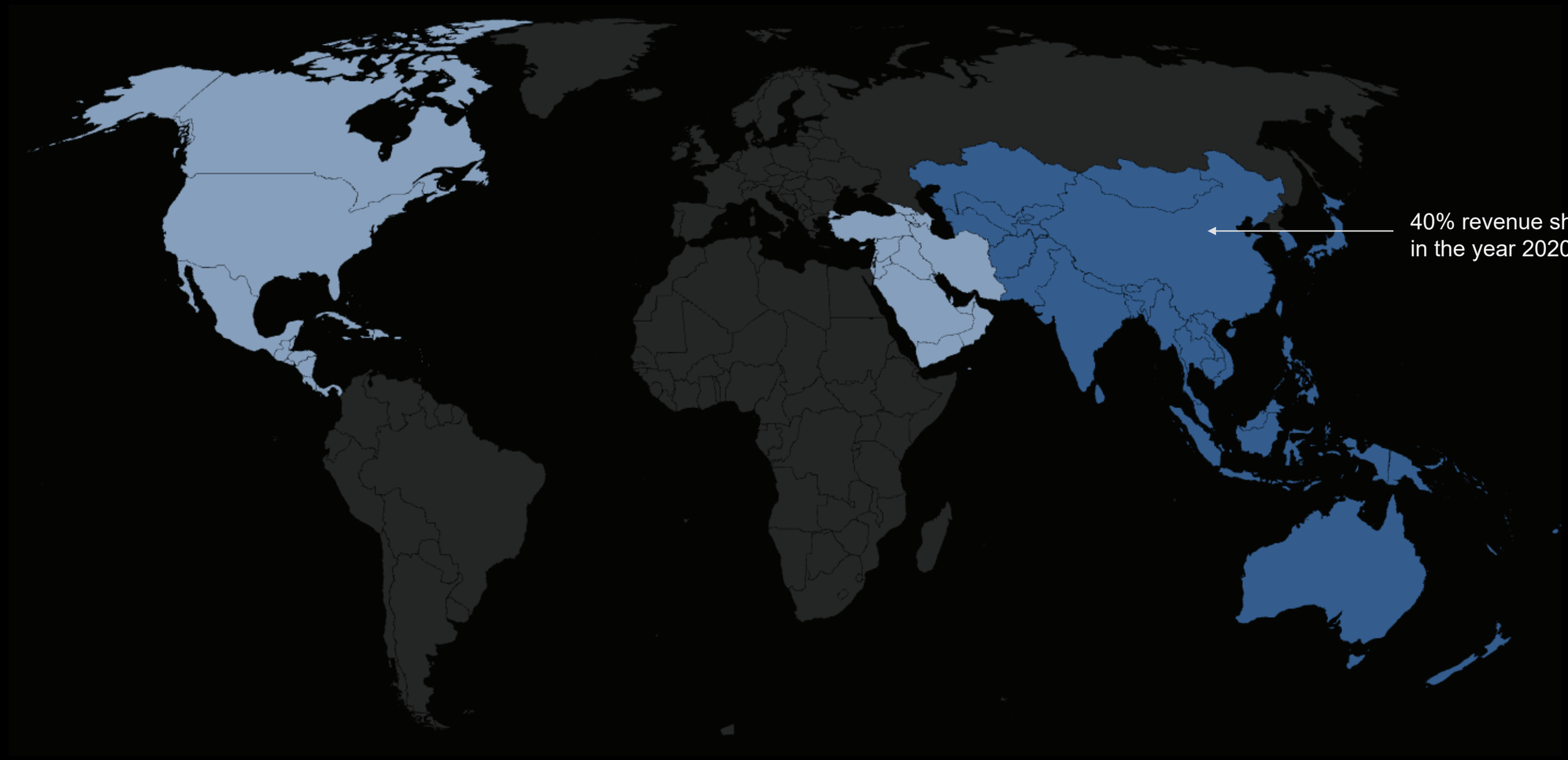
LTCC and HTCC market

Trend by region



Largest market

Fast growing market

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Thank you very much!

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