**Supplementary A**

Additional Data to the experimental part: Summary of the total temperature curves used for the post treatment and the set-up for the measurement of the high-Q resonators.

Ein Bild, das Text, Reihe, Diagramm, Zahl enthält.

Automatisch generierte Beschreibung

**Figure S1:** Combined debinding and sintering curves with variation of the maximum temperature.

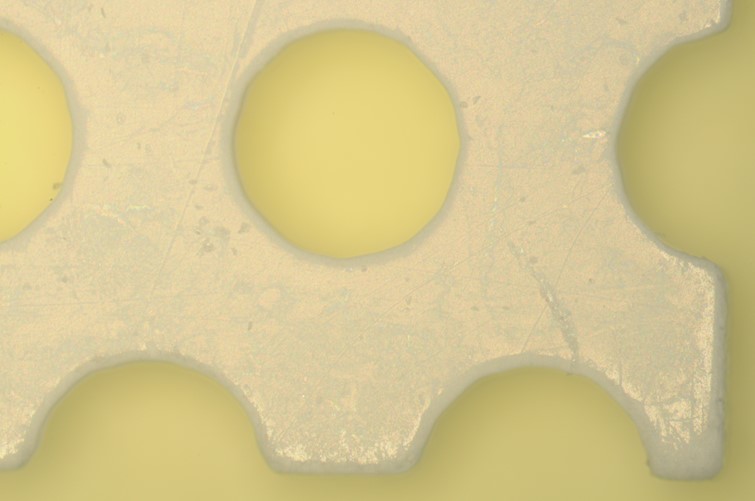
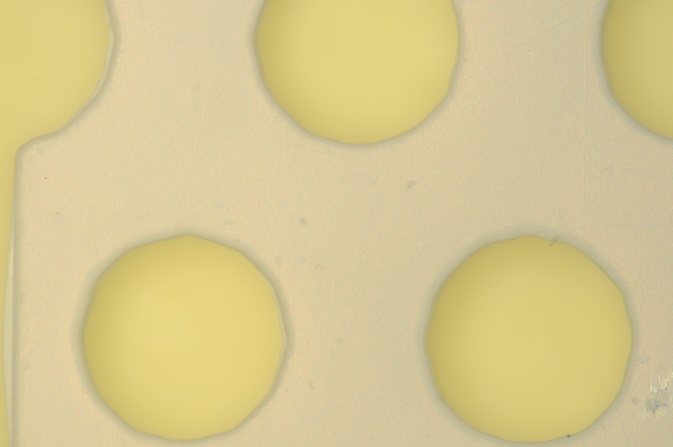
Ein Bild, das Maschine, Armaturenbrett, Elektronik, medizinische Ausrüstung enthält.

Automatisch generierte Beschreibung

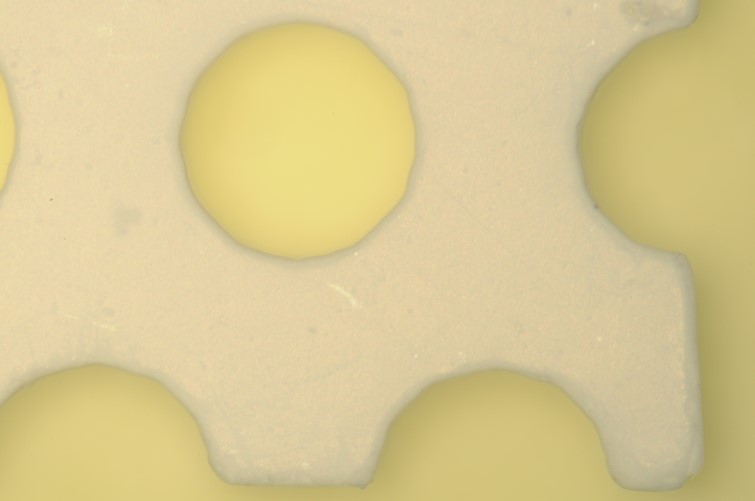
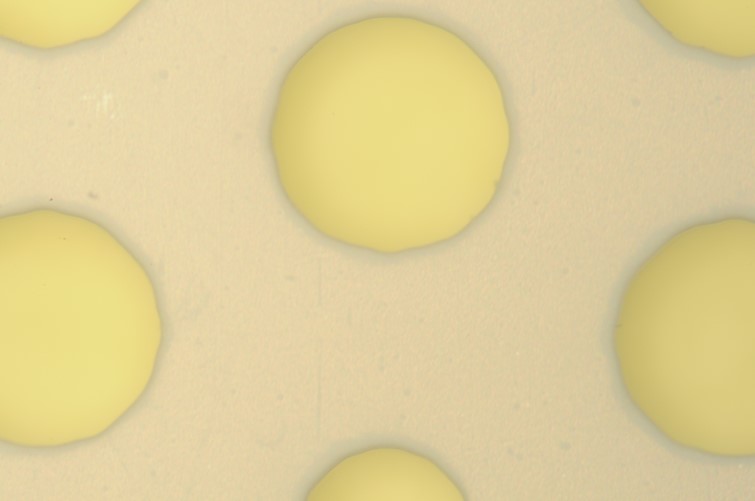
**Figure S2:** Set-up for the characterization of the dielectric properties of the high-Q resonator.

**Supplementary B**

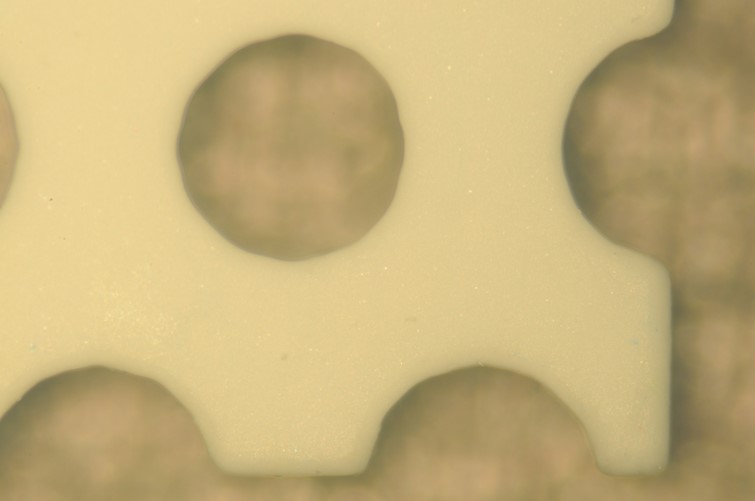
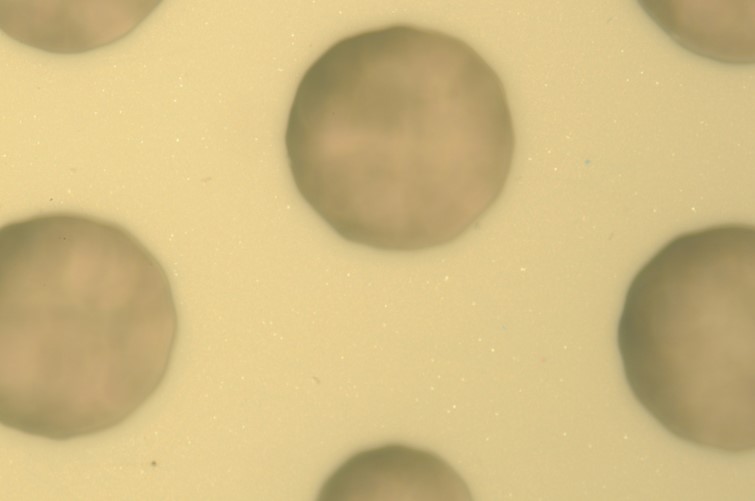
Examples of light microscope investigation of Al2O3 high-Q resonators sintered at different temperatures ranging from 1250 °C – 1650 °C with the same magnification in all pictures. This shows the application of the knowledge about the shrinkage factors during the temperature treatment to create similar sized structures.



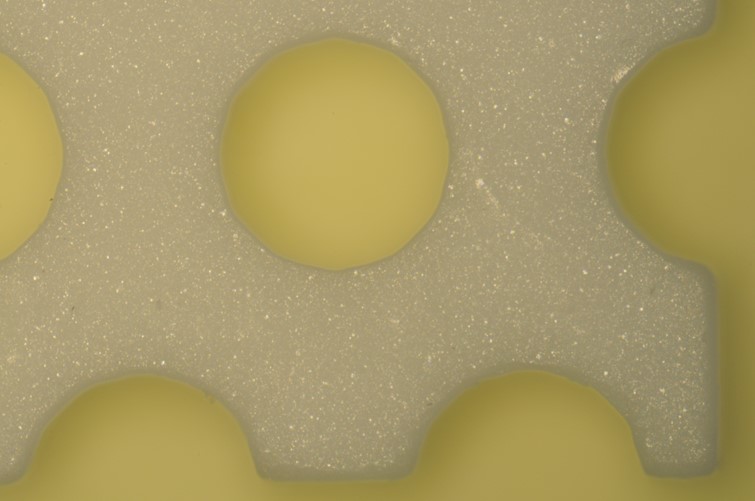
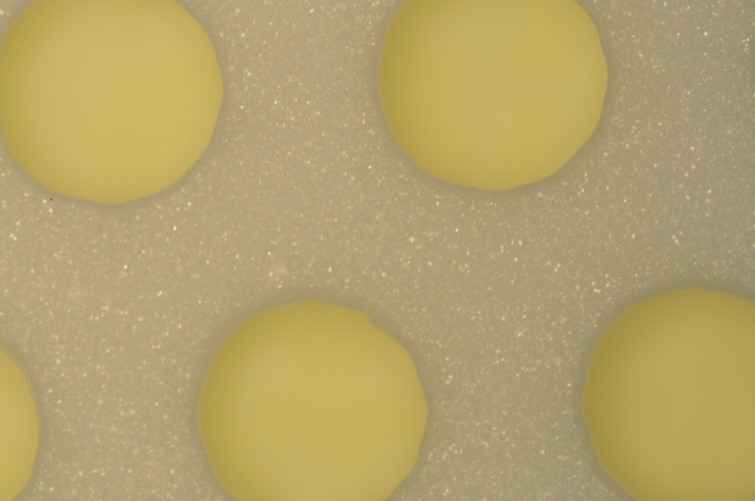
**Figure S3:** Sample sintered at 1250 °C.



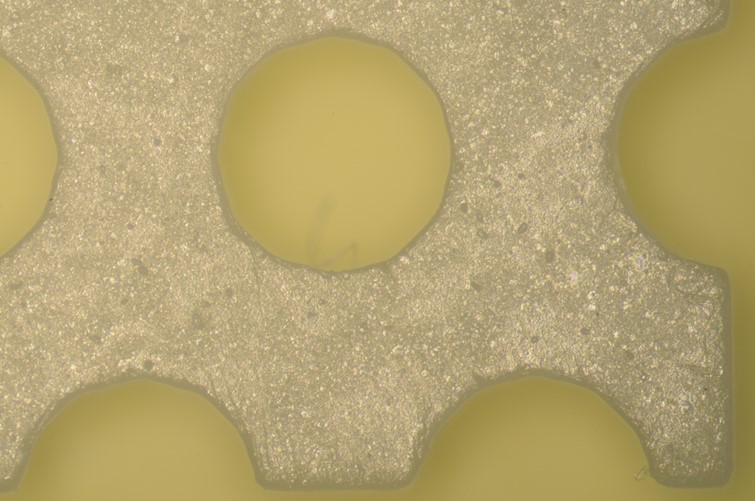
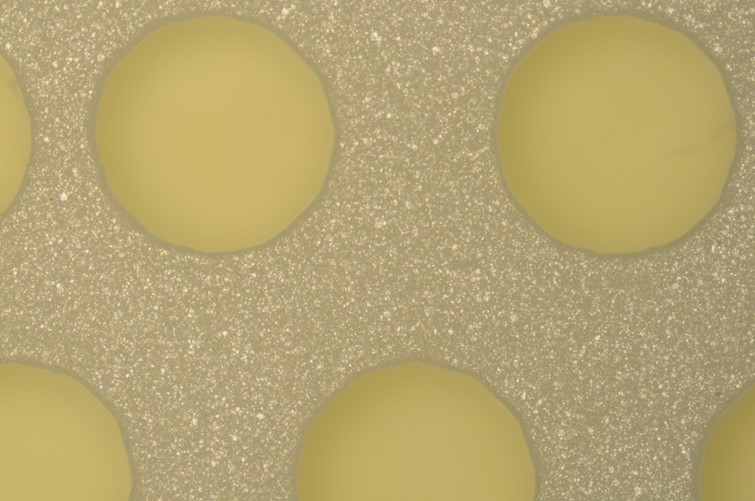
**Figure S4:** Sample sintered at 1350 °C.



**Figure S5:** Sample sintered at 1450 °C.



**Figure S6:** Sample sintered at 1550 °C.



**Figure S7:** Sample sintered at 1650 °C.

**Supplementary C**

Absolute values of the dimensions of the samples based on the investigation with the light microscope.

**Table S1:** Absolute values of the measured and calculated dimensions.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Design | 1250 °C | 1350 °C | 1450 °C | 1550 °C | 1650 °C |
| p [µm] | 1160 | 1155 | 1153 | 1159 | 1161 | 1160 |
| hr [µm] | 345 | 348 | 344 | 342 | 345 | 343 |
| lx [µm] | 12025 | 12020 | 11940 | 11990 | 12080 | 12030 |
| ly [µm] | 12760 | 12707 | 12658 | 12711 | 12820 | 12775 |
| hs1 [µm] | 290 | 289 | 289 | 294 | 285 | 289 |
| hs2 [µm] | 133 | 132 | 131 | 134 | 135 | 135 |
| t [µm] | 789 | 780 | 785 | 790 | 802 | 800 |

**Supplementary D**

Measurement of the parameter in dependency of the frequency for each high-Q resonator. The resonance frequency is marked in red. This shows the shift of the resonance frequency in dependency of the material properties.

Ein Bild, das Text, Diagramm, Reihe, Zahl enthält.

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**Figure S8:** Measurement of the parameter of a high-Q resonator sintered at 1250 °C in dependency of the frequency.

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**Figure S9:** Measurement of the parameter of a high-Q resonator sintered at 1350 °C in dependency of the frequency.



**Figure S10:** Measurement of the parameter of a high-Q resonator sintered at 1450 °C in dependency of the frequency.



**Figure S11:** Measurement of the parameter of a high-Q resonator sintered at 1550 °C in dependency of the frequency.



**Figure S12:** Measurement of the parameter of a high-Q resonator sintered at 1650 °C in dependency of the frequency.