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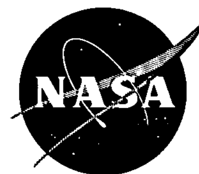
NASA TECH BRIEF



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Contact Material for Pressure-Sintering Ferrites

The problem:

The firing of a laminated ferrite plane or wafer (which has found use in random access memories) causes it to shrink excessively and nonuniformly in all directions. A solution to this problem is to employ pressure-sintering, a process in which the unfired laminate is placed between two flat punches, or plates, and pressed during firing. The application of pressure in this way can reduce the lateral firing shrinkage to less than one percent, thus providing the desired dimensional uniformity. The required volume shrinkage is obtained by a decrease in thickness of the laminate. In any pressure-sintering operating, use of a contact material (between the sample and pressure plate) which does not react with or adhere to the sample being sintered is essential. When pressure-sintering thin, flat wafers without the use of a retaining die, the contact material must remain rigid.

The solution:

Of various contact materials (e.g., dense MgO, graphite, tungsten, molybdenum, stainless steel, and common mica) which were investigated, phlogopite (a variety of mica) was found to be the most suitable for pressure-sintering of ferrite. Satisfactory results were obtained using phlogopite wafers in the thickness range of 0.0005 to 0.0015 inch. Ferrite planes 1.5 × 3.5 × 0.008 inch were successfully pressure-sintered at 1000°C and 4000 psi using these wafers as contact material. Under many firing conditions, phlogopite does not stick at all to the ferrite; when it does stick, it can be easily peeled off or abraded. If abrading is required, it should be done after annealing. No sticking of the phlogopite to the pressure plate (tungsten carbide) was experienced.

Note:

No additional documentation is available.

Patent status:

No patent action is contemplated by NASA.

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Category 01

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