

Charakterisierung der Binderstrukturen im Schaumgrünling und Sinterverhalten von hochlegierten SchlickerReaktions-Stahlschäumen



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Reviews

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(Jorge Hammes)

CHARAKTERISIERUNG DER BINDERSTRUKTUREN IM SCHAUMGRÜNLING UND SINTERVERHALTEN VON HOCHLEGIERTEN SCHLICKEERREAKTIONS-STAHLSCHÄUMEN



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Shaker Verlag Jun 2013, 2013. Buch. Book Condition: Neu. Neuware - The SlipReactionFoamSinter (SRFS)-Process provides a powder metallurgical way to manufacture cellular metals. One objective of this research project was to clarify the chemical composition of the phosphate components and their behavior during the sinter process. Further, the sinter behavior of stainless steel powder was investigated by using different reducing and sinter agents and different sinter atmospheres with regards to the shape of metal foam struts. The identification of binding structures inside the metal foam green sample, of the dehydration and of the reduction behavior was done by means of scanning electron microscopy, high temperature X-ray diffraction and simultaneous thermal analysis. After drying of the green sample, the platelike and meshing phosphate crystals consist mainly of iron(III) components. By the addition of different reducing and sinter agents to the slip, the resulting metal foam struts derive diverse surface morphologies, caused by selective oxidation of alloy elements. A model about the complete sintering procedure of the SRFS-process was developed. Thus, the sintering can be divided into three temperature regions. At first, the dehydration, shrinkage and amorphisation of phosphate structures takes place up to 400 °C. Above 550 °C, the phosphates recrystallize and their reduction starts, which become stronger at about 800 °C. As reaction products pure metal nucleates within the phosphate crystals. These nucleations grow, come into contact with each other and agglomerate to larger elements. In the end, sinter bridges build the strut network, while the phosphates form back completely. Finally, the compressive strength of the metal foams according to DIN 50134 was determined and related to their chemical composition. The compressive yield force was proved to be independent of the density of each tested sample. On the other hand, the plateau force depends sensitively on the density of the...



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