MICRO-DIAMOND SYNTHESIS – A REVOLUTIONARY NEW APPROACH

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HINTERGRUND

Multiple successful experiments showed the crystallization of diamonds after only 6-15hours at 5-7GPa and 1200-1300°C. These parameters are remarkably lower compared to other industrial applicable methods. In addition the diamonds form without the need of a seed crystal and contain no metal impurities.

PROBLEMSTELLUNG

Existing high-pressure-high-temperature methods need to work with extremely high pressure and temperature to allow synthetic diamond formation.

LÖSUNG

The basic idea about the method is the usage of a carboncontaining fluid instead of graphite for diamond synthesis. Special inner and outer capsules together with an adapted pressure medium have been developed that successfully resolve occurring issues using a fluid medium as starting material instead of a solid, e.g. the stabilization of hydrogen fugacity and inhibition of hydrogen exchange
The composition of the carbon-containing fluid, the selection of involved high-pressure materials as well as the pressure and temperature parameters have been carefully optimized to produce a remarkable amount of synthesized micro-diamonds.

VORTEILE

• Lower costs of synthetic diamond production due to only 5-7GPa pressure and 1200-1300°C temperature
• Much faster (<< 1day) reaction compared to established methods
• No seed crystal needed and no metal impurities
• Method compatible to existing high-pressure-high-temperature methods

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ENTWICKLUNGSSTAND

Funktionsnachweis

PATENTSITUATION

EP 18203509 anhängig

CATEGORIES

//Geowissenschaften //Synthesen und Verfahrenstechnik //Smart Materials

ANWENDUNGSBEREICHE

Synthetic diamond formation

SERVICE

• The technology can be licensed or assigned
• Collaborations regarding further development are welcome