Status of R&D of advanced neutron multiplier in ITER-BA activity
(24) Optimization study on Be\textsubscript{12}V pebble granulation

*Petr Kurinskiy\textsuperscript{1}, Jae-Hwan Kim\textsuperscript{1}, Suguru Nakano\textsuperscript{1}, Yoshiaki Akatsu\textsuperscript{1}, Masaru Nakamichi\textsuperscript{1}

\textsuperscript{1}QST, Fusion Energy Research & Development Directorate, Rokkasho Fusion Institute

Beryllium intermetallic compounds (beryllides) are, currently, the most promising materials as advanced neutron multipliers in Japan and the EU in the DEMO R&D of the International Fusion Energy Research Centre (IFERC) project as a part of Broader Approach (BA) activities. In this study, granulation yield properties and characterization of Be\textsubscript{12}V pebbles will be reported.

**Keywords:** neutron multiplier, beryllide, granulation

1. Introduction

Spherical Be\textsubscript{12}V pebbles having the sizes of about 1mm were fabricated using Rotating Electrode Method (REM). The influence of the rotation speed of Be-V rods under constant discharge current on the yield properties of granulation process is presented.

2. Summary

2-1. Experimental

Be-V rods were centrifugally melted using W electrode in the chamber of REM apparatus in atmosphere of high-purity helium (Fig. 1). Rotation speeds equaled to 4500, 5000 and 5500 rpm were used to melt, consequently, two electrodes under each condition while current value remained 60A. Estimated yield properties are shown in Fig. 2.

2-2. Characterisation

Investigation of microstructure and analysis of the yield properties of REM process are presented in this work. X-Ray diffraction technique and electron probe microanlyser were applied for study of microstructural characteristics. Additionally, densities of fabricated beryllide pebbles were defined by the immersion method.

3. Conclusion

Optimization of the granulation parameters of Be-V rods from the point of view of the improvement of the yield of obtained beryllide pebbles is presented and discussed.

\begin{figure}
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\includegraphics[width=0.4\textwidth]{rem_apparatus.png}
\caption{Schematic view of REM apparatus}
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\begin{figure}
\centering
\includegraphics[width=0.4\textwidth]{yield_properties.png}
\caption{Yield properties of Be-V pebbles using 60A current}
\end{figure}