

## Accepted Manuscript

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PII: S0167-577X(18)31206-0  
DOI: <https://doi.org/10.1016/j.matlet.2018.08.016>  
Reference: MLBLUE 24727

To appear in: *Materials Letters*

Received Date: 12 June 2018  
Revised Date: 28 July 2018  
Accepted Date: 5 August 2018

Please cite this article as: X. Li, X. Yan, H. Liang, Q. Wang, L. Lei, F. Peng, KeYang, D. He, Unusual grain coarsening behavior of bismuth under high pressure, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.08.016>

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## Unusual grain coarsening behavior of bismuth under high pressure

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### Abstract:

It is well known the atomic diffusion caused by high temperature leads to conspicuous grain coarsening, which is of crucial importance to the properties of materials. High pressure usually slows down the diffusion rate of atoms and refines the grain size. In this study, using synchrotron angle dispersive x-ray diffraction (ADXRD) techniques, we observed an abnormal grain coarsening behavior of bismuth (Bi) stemming from the high pressure phase transition at room temperature, demonstrating that the grain coarsening can also be triggered by pressure. Two factors mainly give raise to this unusual coarsening behavior of Bi: (1) the nucleation rate of new phase is very slow during transformation according to the kinetics study of the phase transition in Bi, which inhibits the grain refinement; (2) the liquid interphase in the phase transition process enables the recrystallization of Bi under high pressure. Our experiment results are consistent with the previous

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