

技术及应用

## 氟化锆的<sup>3</sup>He释放特性研究

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**摘要** 对两块ZrT<sub>x</sub>样品的<sup>3</sup>He释放进行了6 a跟踪监测。结果表明: 样品早期的<sup>3</sup>He释放系数(RF)为10<sup>-6</sup>~10<sup>-5</sup>, 随着<sup>3</sup>He浓度增加到0.31时, 其RF值缓慢增长至10<sup>-4</sup>量级, 然后, 样品<sup>3</sup>He释放的增速加快, 当<sup>3</sup>He浓度达到0.38时, 样品<sup>3</sup>He释放出现暴涨, RF值迅速增长至10<sup>-1</sup>量级, 这一时期定义为样品的<sup>3</sup>He加速释放阶段。当ZrT<sub>x</sub>样品达到<sup>3</sup>He加速释放阶段后, 对样品5.6 s的<sup>3</sup>He释放扫描谱表明, 此时样品以两种方式向外释放<sup>3</sup>He, 一种是以均匀的速率(约为生成速率的50%)向外扩散, 一种以瞬时爆发的方式向外逃逸, 每次爆发约释放出10<sup>12</sup>~10<sup>14</sup>个原子。

**关键词** [氟化锆](#); [<sup>3</sup>He释放](#); [释放系数](#); [加速释放阶段](#); [爆发](#)

**分类号** [TL2](#); [TL99](#)

## Study on <sup>3</sup>He Release Character of ZrT<sub>x</sub>

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**Abstract** <sup>3</sup>He release from 2 ZrT<sub>x</sub> samples was measured incessantly within 6 years. Measurement results show that the early <sup>3</sup>He release fraction (RF) of 2 samples was at 10<sup>-6</sup>-10<sup>-5</sup> level, which can raise slowly to be at 10<sup>-4</sup> level with the <sup>3</sup>He concentration raising to 0.31, and then the increase rate of the RF value is higher than that of before. When the <sup>3</sup>He concentration in the samples are more than 0.38, the increase of the <sup>3</sup>He release can get so rapidly that the RF value raises to 10<sup>-1</sup> level in a short time. This period is defined as the accelerated release phase of the samples. <sup>3</sup>He release from 2 samples in 5.6 seconds were scanned in the period after the samples' accelerated release phase. Scan spectra show that there are 2 modes for the <sup>3</sup>He release from the ZrT<sub>x</sub> sample, one is the diffusion mode in which the <sup>3</sup>He release with a equal speed which is about 50% of the produced speed, and the other is the burst mode in which about 10<sup>12</sup>-10<sup>14</sup> <sup>3</sup>He atoms erupt from the sample in a burst way.

**Key words** [zirconium](#) [tritide](#) [<sup>3</sup>He](#) [release](#) [release](#) [fraction](#) [accelerated](#) [release](#) [phase](#) [burst](#)

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