

技术及应用

## 气体离心机流场模拟中源汇的耦合

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**摘要** 用源汇模拟同位素分离气体离心机流场的供取料驱动和机械驱动是离心机流场计算中的方法之一。通过重新推导流体动力学方程组中的源汇表达式, 得到不同的表达式。推导出的表达式反映了源汇之间的互相关联以及流场与源汇之间的互相影响, 即源汇耦合, 这些在以往的计算过程中均被忽略。由于考虑了源汇耦合, 使得计算过程中部分源汇成为未知量, 需在流场求解过程中予以确定。通过比较有无考虑源汇耦合计算得到的离心机流场可知, 不考虑源汇耦合得到的结果虽能反映出分离室中流动基本规律, 但数值上存在差异, 得到的分离功也有较大差别。因此, 计算过程中应考虑源汇的耦合。

关键词 [气体离心机](#) [流场](#) [源汇](#) [分离功](#)

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## Coupling of Sources and Sinks in Flow Field Simulation of Gas Centrifuge

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**Abstract** The sources and sinks are used to simulate the mechanical drives and the drives of the feed and withdrawals in the simulation of the flow field of a gas centrifuge for isotope separation. The new sources and sinks terms in the hydrodynamic equations are re-derived, which are different from those used in the literature. The new terms reflect the association of a type of sources and sinks with another type of sources and sinks, and the interaction of sources and sinks with the flow field, which is referred to as the coupling of the sources and sinks. Due to the coupling, which is not taken into account before, some sources and sinks terms become unknowns, which have to be determined along with the solution of the flow field. Comparing the results with and without the consideration of the coupling, it is shown that the basic flow patterns in the separation chamber are similar, but the values of the flow quantities are different and so the separative power has a quite big difference. So the sources and sinks coupling should be taken into account in the simulation of the flow field of gas centrifuges.

**Key words** [gas](#) [centrifuge](#) [\\_](#) [flow](#) [field](#) [\\_](#) [sources](#) [and](#) [sinks](#) [\\_](#) [separative](#) [power](#)

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