

中国评价核数据库 第二版(CENDL-2)的改进和完善

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为了更好地满足国内使用和国际交流的需要, 对 CENDL-2 做了进一步扩充、更新和改进, 主要内容包括: (1) 在各个评价数据的文档 1 中增加热截面及共振积分等特征值; (2) 改进 20 个核文档 5 次级中子能谱低能区的数据: ^{16}O , ^{23}Na , Mg , Si , P , S , K , Ti , ^{51}V , Ni , Zr , Cd , In , Sb , Hf , W , ^{197}Au , Pb , ^{237}Np , ^{239}Pu ; (3) 改进 8 个核的全截面及弹性散射截面的数据: S , K , Ti , Zr , Sb , Hf , Pb ; (4) 对 13 个核增加 γ 产生数据文档: Ti , Zn , Zr , Mo , Cd , In , Sn , Sb , Hf , Ta , W , ^{197}Au , Pb ; (5) 利用新的 UNF 等理论计算程序, 重新评价 ^9Be , Ca , ^{238}U 等重要核素, 使之包含双微分截面, γ 产生数据及协方差数据等; (6) 利用新的 UNF 程序, 新增加 ^{56}Fe , Hg , Tl , Cl , Lu , Ga 等核的评价数据, 它们有的是现有先进评价核数据库中没有的, 或是数据太陈旧的, 但都是 IAEA 感兴趣和支持的; (7) 新收入在日本完成的 ^{27}Al , ^{59}Co , $^{54, 57, 58, \text{nat}}\text{Fe}$, $^{50, 52, 53, 54, \text{nat}}\text{Cr}$, $^{63, 65, \text{nat}}\text{Cu}$, ^{55}Mn , ^{93}Nb , $^{\text{nat}}\text{Ag}$ 等 17 个天然核及其单一同位素的评价数据。为了满足自洽性要求或数据文档的完整性, 其中 8 个核: ^{27}Al , ^{59}Co , $^{\text{nat}}\text{Fe}$, $^{\text{nat}}\text{Cr}$, $^{\text{nat}}\text{Cu}$, ^{55}Mn , ^{93}Nb , $^{\text{nat}}\text{Ag}$ 将取代 CENDL-2 中原有的评价数据。

CENDL-2 的改进和完善工作将于 1995 年初完成, 届时它将是包含有 68 个核素, 数据类型比较齐全的评价核数据库。例如: (1) 给出文档 6 双微分截面数据的核素有 14 个: D , T , ^3He , ^9Be , ^{19}F , Cl , Ca , ^{56}Fe , Ga , Lu , Hg , Tl , ^{235}U , ^{238}U ; (2) 给出文档 12 - 15 γ 产生数据的核素有 49 个: D , ^7Li , ^9Be , ^{10}B , ^{16}O , ^{19}F , ^{27}Al , Cl , Ca , Ti , $^{50, 52, 53, 54, \text{nat}}\text{Cr}$, ^{55}Mn , $^{54, 56, 57, 58, \text{nat}}\text{Fe}$, ^{59}Co , $^{63, 65, \text{nat}}\text{Cu}$, Zn , Ga , Zr , ^{93}Nb , Mo , $^{107, 109, \text{N}}\text{Ag}$, Cd , In , Sn , Sb , Lu , Hf , ^{181}Ta , W , ^{197}Au , Hg , Tl , Pb , ^{235}U , ^{238}U , ^{240}Pu , ^{241}Am ; (3) 给出文档 31 - 33 协方差数据的核素有 11 个: D , T , ^3He , ^9Be , ^{16}O , ^{19}F , ^{56}Fe , ^{235}U , ^{238}U , ^{240}Pu , ^{241}Am 。

关键词 CENDL-2 改进 完善

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ANALYSIS ON DOUBLE DIFFERENTIAL CROSS SECTIONS OF ${}^9\text{Be}(n, 2n)$ REACTION

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ABSTRACT

The double differential cross section for ${}^9\text{Be}(n, 2n)$ reaction is of interest in the nuclear data need. The present paper treats the reaction as nuclear processes with different mechanisms, the appropriate formulae of double differential cross section corresponding to both mechanisms are derived by using dynamics and quasi-free scattering approach. The partial cross sections are given by Tepel-Weidenummler statistical model. With suitably chosen structure parameters of ${}^9\text{Be}$ and ${}^8\text{Be}$, and the Gaussian average on the level widths and energy resolution, the calculations of the double differential neutron production cross sections at some angles for 14.2, 10.1 MeV incident neutron have been performed and shown in good agreement with experimental data.

Key words Double differential cross section Cascade decay Partial cross section



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THE MODIFICATION AND IMPROVEMENT FOR THE SECOND VERSION OF CHINESE EVALUATED NUCLEAR DATA LIBRARY (CENDL-2)

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ABSTRACT

The modification and improvement of CENDL-2 is introduced.

Key words CENDL-2 Modification Improvement