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异丙醚-磷酸三丁酯溶剂萃取与阴离子交换法从Fe(Ⅱ),Mn(Ⅱ),Co(Ⅱ),Cu(Ⅱ)的盐酸溶液中分离Co(Ⅱ)及~(57)Co

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摘要 <正> 钴的同位素~(57)Co不仅可以标记博来霉素(Bleo-mycin)和维生素B_(12)等化合物,而且还可以用来制备穆斯堡尔源。最近几年,穆斯堡尔效应的研究越来越广泛。因此~(57)Co的研制和生产方法引起了人们的重视。我们选用铁作靶材(在铜的衬底上电镀铁),氘核为轰击粒子,产生核反应:~(56)Fe(d,n)~(57)Co,~(56)Fe(d,a)~(54)Mn,~(57)Fe(d,2n)~(57)Co,~(57)Fe(d,n)~(58)Co,。本文针对上述体系采用异丙醚-TBP萃取除铁,阴离子交换精制纯化~(57)Co,

关键词 异丙醚 磷酸三丁酯 萃取 阴离子交换 ~(57)Co

分类号

SEPARATION OF Co(Ⅱ) OR ITS ISOTOPE ~(57)Co FROM Fe(Ⅲ), Mn(Ⅱ), Cu(Ⅱ) AND Co(Ⅱ) IN HYDROCHLORIC ACID SOLUTION WITH ISOPROPYL ETHER-TRIBUTYL PHOSPHATE EXTRACTION AND ANION EXCHANGE

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Abstract The relations of the distribution ratios of Fe(III), Mn(Ⅱ), Cu(Ⅱ) and Co(Ⅱ)in aqueous and organic phases to the acidity, the concentration of isopropyl etherand tributyl phosphate(TBP) and the volume ratios between isopropyl ether andTBP are studied. When the mixed solution of Fe(III), Mn(Ⅱ) and Co(Ⅱ) in4mol/l HCl medium is extracted by isopropyl ether-TBP, the distribution ratioof Co(Ⅱ) is less than 0.1, i. e. the loss of Co(Ⅱ) is 1owered to the mini-mum, and that of Fe(III) is equal to 15, that is, enhanced considerably. Afterthe solvent extraction, further enrichment and separation of Co(Ⅱ) are carriedout by anion exchange. The mean value of the measured recovery for Co(Ⅱ) is93+7%. The contents of impurity elements in 93μg of Co(Ⅱ) are as follows:Fe(III) 2.0 μg, Mn(Ⅱ) 0.0 μg, Cu(Ⅱ) 0.0μg. The bombardment of the irontargets is performed in a 120 cm cyclotron, on the external and interna1 targetassemblies, with 12.5 MeV and 8.0 MeV deuterons, respectively. The cumulativebeam intensities are 128 μA·h and 50 μA·h, respectively. After cooling, theisotopes of Co(Ⅱ), i. e. ~(57)Co, ~(56)Co and ~(58)Co are separated from ~(54)Mn, ~(59)Fe and~(63)Cu [or Cu(Ⅱ)] using the method of isopropyl ether-TBP solvent extraction andanion exchange. A sample of 100 μl taken from the separated solution is driedby heating and the measurement of γ-spectrometry is carried out by means of aGe-Li detector combined with a pulse amplitude analyser with 4096 channels. Itis shown that the bombardment of iron targets by 8.0 MeV deuterons produced~(57)Co of higher purity in which ~(58)Co amounted to only 8% and no other radioac-tive impurities including ~(56)Co are detected. The result obtained in this way issatisfactory.

Key words Isopropyl ether Tributyl phosphate(TBP) extraction Anionexchange ~(5

7)Co

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通讯作者