

원자력 산업용 전고체형 단일종모드 Ti:Sapphire 레이저의 설계
Design of All Solid State Tunable Single-Mode
Ti:Sapphire Laser for Nuclear Industry

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요 약

다이오드 여기 전고체형 녹색광 레이저를 사용하여 펌핑하는 Ti:Sapphire 레이저를 설계하였다. 여기용 녹색광 레이저의 출력은 20 W, 반복율 10 kHz를 가정하였다. Ti:Sapphire 레이저는 에탈론을 사용하여 단일종모드 발진이 이루어지게 설계하였다. 레이저출력의 시간적 변화와 각 종모드들의 증폭율을 비울방정식을 사용하여 계산하였으며, 단일모드 발진이 가능함을 보였다.

Study on Laser-induced Photoredox Reaction for Extraction of
Precious Elements from Nuclear Waste Solutions

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Abstract

The extraction of precious metals from aqueous solutions is performed by using a photoredox reaction with a Q-switched Nd:YAG laser. The metallic silver was efficiently precipitated and extracted from the silver nitrate solution by laser photolysis. An optimum reaction condition for silver extraction was determined by adjusting various experimental factors such as type of reducing agent, type of acids and time of photoreaction. The composition of the reaction product was analyzed and it was identified as metallic silver. The photoreaction of chromium(III) chloride in an acidic aqueous solution was also investigated. The 355 nm laser light was better suited for the reaction of silver nitrate as well as chromium(III) chloride in acidic solution compared to the 532 nm light.