



Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

## Journal of Nuclear Materials

journal homepage: [www.elsevier.com/locate/jnucmat](http://www.elsevier.com/locate/jnucmat)



# Development of carbon deposits cleaning technique for metallic mirrors in HL-2A

Y. Zhou<sup>a,\*</sup>, L. Zheng<sup>a</sup>, Y.G. Li<sup>a</sup>, L.C. Li<sup>a</sup>, C.Z. Li<sup>a</sup>, Y.M. Jiao<sup>a</sup>, Z.C. Deng<sup>a</sup>, G. Zhao<sup>b</sup>, H. Gao<sup>b</sup>,  
Q.W. Yang<sup>a</sup>, X.R. Duan<sup>a</sup>

<sup>a</sup>Southwestern Institute of Physics, P.O. Box 432, Chengdu Sichuan 610041, PR China

<sup>b</sup>South-west Institute of Technical Physics, Chengdu 610041, PR China

### ARTICLE INFO

*Article history:*

Available online 15 December 2010

### ABSTRACT

In order to develop effective techniques for the cleaning of in-vessel optical components from deposited carbon films, a Q-switched Nd:YAG laser cleaning system for HL-2A tokamak first mirrors has been tested in the laboratory recently. A polycrystalline molybdenum mirror sample exposed in HL-2A tokamak with a deposited carbon film of 1  $\mu\text{m}$  was used to demonstrate the feasibility of the proposed laser cleaning technique. The test was performed on a Mo mirror with an area of 20 mm  $\times$  20 mm. The carbon deposits were almost completely removed by multiple pulses repeated spatial scans. Reflection of the Mo mirror was investigated before and after the laser cleaning. In the wavelength range of 1200–2500 nm we found that the reflectivity of the metallic mirror was recovered to  $\sim$ 90% after the cleaning procedure.

© 2010 Elsevier B.V. All rights reserved.