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Published in:
Applied Optics

DOI:
10.1364/AO.386409

Publication date:
2020

Citation for published version (APA):
Smyth, C. J. C., Mirkhanov, S., Quarterman, A. H., & Wilcox, K. G. (2020). 27.5 W/m² collection efficiency solar laser using a diffuse scattering cooling liquid: erratum. Applied Optics, 59(3), 800. https://doi.org/10.1364/AO.386409
27.5 W/m² collection efficiency solar laser using a diffuse scattering cooling liquid: erratum

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Received 18 December 2019; posted 18 December 2019 (Doc. ID 386409); published 17 January 2020

In this erratum we clarify our previously published paper [Appl. Opt. 57, 4008 (2018)], where we used a solar spectrum truncated to a maximum wavelength of 830 nm in the numerical modelling, but did not state this in the paper. Here, we present a graph of the numerically modelled absorption in the Nd:YAG rod as a function of the diffuse reflectivity of the chamber walls using the full solar spectrum, confirming that the theoretical maximum possible absorption we predict is in agreement with literature values.

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https://doi.org/10.1364/AO.386409

In [1], collection efficiency solar laser using a diffuse scattering cooling liquid,” Fig. 2 displays a computational model generated graph of the percentage of solar rays absorbed in the Nd:YAG rod as a function of the reflectivity of the diffuse scatterer in contact with the side wall of the rod [1]. This figure was generated using a standard AM 1.5 solar spectrum that was truncated to a maximum wavelength of 830 nm to increase computational efficiency. This wavelength is slightly above the maximum absorption wavelength in Nd:YAG and contains 59.5% of the total power in the solar spectrum. We did not state in Ref. [1] that a truncated spectrum had been used in the model.

Figure 1 is the equivalent graph of the modelled absorbed rays as a function of the reflectivity of the diffuse scatterer with the entire solar spectrum considered.

The modelled absorption, reaches a maximum of 15% for 100% side wall diffuse reflectivity. This is slightly lower than the maximum possible absorption in Nd:YAG of 16%, when only the spectral overlap of the absorption spectrum of Nd:YAG with the solar spectrum is considered [2,3]. The difference is due to the additional loss from the Fresnel transmission of rays interacting with the end faces of the laser rod.

With regards to Table 1 in Ref. [1] where we report the experimentally measured loss from our collection optics we would like to reiterate that all losses, including the total loss, were individually experimentally measured and none calculated.

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