



Heat Transfer in Spherical Micro Solar Cell Modules

A.P. Negoiaș¹, A.M. Morega^{1,2} and M. Morega¹

¹ Faculty of Electrical Engineering
University POLITEHNICA of Bucharest

Splaiul Independenței nr. 313 sector 1, 060042 Bucharest (Romania)

Phone number:+40 021 4029153, e-mail: negoias_andrei@yahoo.com, amm@iem.pub.ro, mihaela@iem.pub.ro

² Institute of Statistical Mathematics and Applied Mathematics “Gh. Mihoc – C. Iacob”, Romanian Academy
Calea 13 Septembrie No.13, Sector 5, 050711, P.O. BOX 1-24, 70700, Bucharest, (Romania)

Fax number +40 21 3182439

Abstract. Recently, spherical solar cells (SPVC) have drawn attention due to their low costs, flexibility, and efficiency: spherical reception surface can intercept sunlight in all directions thus increasing its power generation capacity. This paper reports a numerical analysis of steady state heat transfer from the SPVC to the ambient, unveiling the underlying paths and mechanisms. Within the limits of acceptable simplifying assumptions we define a sequence of 3D FEM models aimed at investigating the convective heat transfer processes: natural convection cooling and forced convection of a SPVC panel. The results may be used to optimizing the thermal design of SPVC modules.

Key words

Photovoltaic cells, spherical cells, heat transfer, numerical simulation, finite element.

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