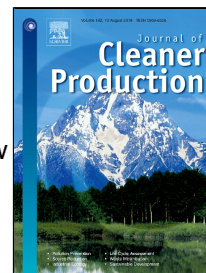


# Accepted Manuscript

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PII: S0959-6526(18)31698-6  
DOI: 10.1016/j.jclepro.2018.06.048  
Reference: JCLP 13194  
To appear in: *Journal of Cleaner Production*  
Received Date: 31 March 2018  
Accepted Date: 06 June 2018

Please cite this article as: Evangelos Bellos, Zafar Said, Christos Tzivanidis, The use of nanofluids in solar concentrating technologies: a comprehensive review, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.06.048

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# The use of nanofluids in solar concentrating technologies: a comprehensive review

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## Abstract

Solar energy exploitation is one of the most important weapons for facing the recent environmental and energy management dangers. Concentrating solar collectors can produce useful heat in medium and high-temperature levels. So, they can be used in a great variety of applications as space-cooling, industrial heat, chemical processes and electricity production. The use of nanofluids is one of the most effective ways for enhancing the performance of the concentrating collectors. In this paper, the use of nanofluids as working fluids in concentrating solar collectors is investigated in detail. The examined collector types are the following: Evacuated tube collectors with booster reflector, concentrating thermal photovoltaics, compound parabolic concentrator, parabolic trough collector, linear Fresnel reflector and solar dishes. Moreover, the use of nanofluid-based solar concentrating collectors in applications (heating, cooling, electricity, and trigeneration) is investigated in this work. The emphasis is given to the determination of the thermal efficiency enhancement of the collector with the use of the nanofluids in every case. The recent trends in nanofluid utilization are given in this work. Furthermore, the challenges and the future work about the nanofluid-based solar systems are discussed in details.

## Keywords

Solar concentrating collectors, nanofluids, thermal enhancement, applications, nanofluid challenges

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