# STUDY OF SOLAR CELLS WITH OPTIMIZED QUANTUM EFFICIENCY

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**Abstract.** *Substrate of silicon become classic, but costly in terms of technology and other strategic areas, was replaced by unconventional supports such as nanocomposites glasses, plastic materials Kapton type or metal foil of titanium and stainless steel. CIGS is the basic active element of the designed structure and represents magnetron target of $CuInS_2$ doped with Ga. The influence of Ga doping concentration is the main factor which may increase the quantum efficiency ($Q_{eff}$) of photovoltaic element, up to 17% - 19%, mean 5% more than the commercial products approved in the European market. Process, "Ion assisted RF magnetron sputtering" is the most reliable and versatile technique reported to MBE (molecular beam epitaxy).*

**Keywords:** solar cell, kapton, magnetron–sputtering

## 1. Introduction

The solar cell industry has grown quickly in recent years due to strong interest in renewable energy and the problem of global climate change. Currently, silicon solar cells rule the photovoltaic (PV) market. The best commercial Si PV modules have an efficiency of about 15-19% and cost between 4$ and 5$/Wp (Watts peak). PVs based on CdTe, CuInGaSe (CIGS), CuInSe (CIS), and organic materials are being developed with the aim of reducing the price per watt even if that means sacrificing conversion efficiency and reliability [1].

Silicon solar cells were initially used in the exploration of space, which remains an important application today [2]. Since their first development in the late 1950s, the efficiency of these cells has risen from 6% to more than 15%. This plus a decrease in cost and increase in production throughput has permitted companies to sell them for terrestrial use. In the 1980s, a new generation of solar cells based on III-V compound semiconductors, namely GaAs and InGaP, came into use in space applications [3]. Complex heterostructures based on arsenides and phosphide multijunction solar cells were developed and then realized on Ge substrates by means of metal-organic vapor phase epitaxy. Improvements in the 1990s

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