

Optimised etching performance thanks to patented “HDF immersion process”

The most homogeneous etching rates coupled simultaneously with a high throughput – RENA sees no contradiction in these two targets where the etching processes in thin film are concerned. The question of increasing the efficiency of thin film solar cells compared to silicon solar cells is one that comes under discussion time and again. Continuous improvement in this field will remain the technical target even in the future and will lead to an even higher growth in the market share of thin film technology. Each and every process that can be optimised within the value-added chain promotes this target. With the excellent results in the etching process achieved by RENA PVGlassEtch systems, RENA has proved itself the ideal partner.

The surface of transparent conductive oxides (TCO) is structured with RENA HCl etching systems. Whereby a structure is produced in the oxide layers (TCO) using anisotropic etchants. This structure refracts the incident light thus lengthening the optical path in the underlying absorber material of the solar cells. This process has the effect of increasing the portion of absorbed light. More specifically this means a relative increase in the degree of efficiency of the solar cell, an increase that can be measured in percentages. Etching is carried out by means of the patented “HDF (High Dynamic Flooding) immersion process”. Whereby the etchant is introduced on the substrate in the form of a standing wave. The most important benefit of this innovative process: the introduction of the medium on the substrate is “turbulence-free”. Extremely uniform etching results are achieved with this future-orientated technology, without the formation of clouding or flow marks on the substrates. Previously used or other methods such as spray techniques or other dip techniques feature just such decisive disadvantages thus leading to inhomogeneity.

The modular design of the RENA PVGlass etching systems allows customer requirements for different process sequences to be configured individually and flexibly. The system can process all standard substrate sizes (650/1150/1350/2250) as well as individual sizes. Top quality results are achieved thanks to the flexible, process-specific sequencing of cleaning (brush cleaning, ultrasonic cleaning etc), etching, rinsing and drying processes. With a transport speed of 2.5 m/min and a low 0.01 % breakage rate, minimised media consumption and an uptime of > 97 % the system achieves the economic requirements demanded for the future.

This type of system is also ideally suited for other etching steps in the field of thin film technology. For NP etching in the case of CdTe cells, for example, or KCN etching of CIGS cells. The RENA product portfolio in the field of thin film technology also offers system modules equipped with the appropriate technology for flexible substrates, glass cleaning systems as well as coating and electroplating equipment for the deposition of Cu-In-Ga, CdS/ZnS or CdCl₂.

Profound technological experience and many years of competence in wet-chemical silicon solar wafer/cell inline processing make RENA the ideal partner for innovative concepts and systems that increase efficiency in the field of thin film technology. Since the middle of the year 2007 RENA has intensified its activities in the thin film market – not least due to the experience gained in the PCB industry – and is already in a position to present a number of remarkable developments. The RENA



RENA GmbH
Ob der Eck 5
D-78148 Gütenbach
www.rena.com

group employed 950 people internationally in the year 2008 when it achieved a turnover of € 200 m. The consistent development of numerous sales and service branches throughout the world means that RENA is today in a position to offer top proximity to customers and the market.

Press contact:
RENA GmbH
Norbert Bürger / Michaela Schätzle
Phone: +49 7723 9313-19
Norbert.buerger@rena.de