



Water and Wastewater Treatment for the Photovoltaic Industry

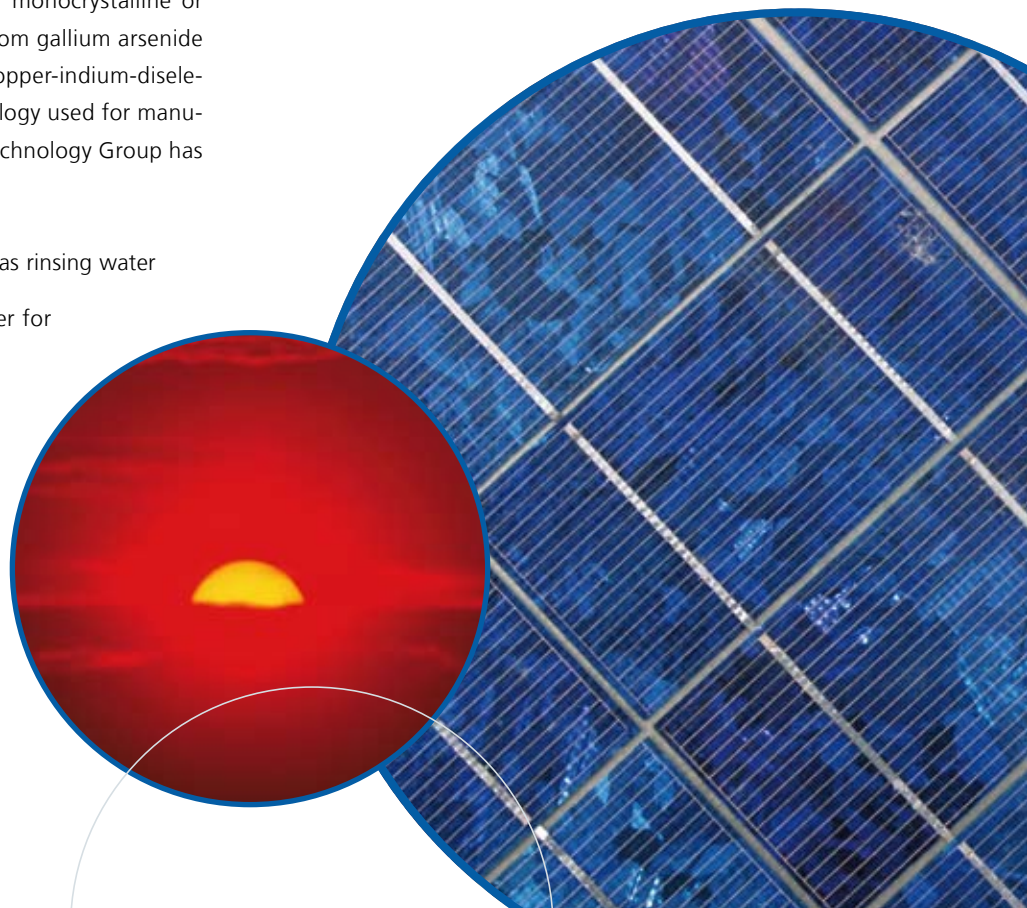
Solar cells are booming. The ecological generation of electricity from sunlight has become more efficient and cheaper thanks to the use of new technologies. The proportion of the total electricity generated with solar cells is increasing continually.

Ultrapure rinsing water is needed for the production of photovoltaic elements in order to clean them. On the other hand, the resulting wastewater has to be processed in order to remove undesirable substances, which can then be re-used. The valuable substances recovered in this manner, and also the resulting clean water, can be returned to the production process.

There are various basic types of photovoltaic elements: those made from layers of amorphous, monocrystalline or polycrystalline silicon and those made from gallium arsenide (GaAs), cadmium telluride (CdTe) or copper-indium-diselenide (CuInSe₂). Regardless of the technology used for manufacture of solar cells, the Christ Water Technology Group has the right solutions for all requirements:

- Production of ultrapure water for use as rinsing water
- Treatment and recycling of wastewater for detoxification and neutralisation
- Removal and recycling of heavy metals and recovery of valuable substances with the aid of special resin regeneration systems

The facility for regeneration of resins containing heavy metals with the REMA[®]-System of UT&S is a unique benefit which only the CHRIST Group can offer.





Treatment of process water

Process water needs to be treated in order to remove suspended and dissolved substances from the incoming raw water. Depending on the required water quality, this can be done by various methods. The companies of the CHRIST Group have many years of experience in the areas of printed-circuit technology and microelectronics.

Since the requirements of the solar-cell industry are very similar to those in the printed-circuit and microelectronics industries, you can benefit from CHRIST's experience gained in many semiconductor projects. In the past few years, CHRIST has constructed water-treatment systems for the semiconductor industry with outputs of a few cubic metres per hour up to several hundred cubic metres per hour. With our ion-exchanger technology MGR and the CHRIST EDI module SEPTRON®, we possess key technologies for production of the necessary quantities of ultrapure water with the required quality at optimised costs. The EDI - module SEPTRON® is a process which demineralises water without the use of chemicals. The ideal combination of process steps also ensures a very good price-performance ratio, since the high efficiency reduces the operating costs.

You, as our customer, can be sure that you are using proven technologies with individually optimised operating and investment costs.





Wastewater treatment and recovery of valuable substances

The wastewater generated by the solar-cell manufacturing processes consists, amongst other things, of diluted rinsing and process water which can be recycled with the aid of ion-exchanger circulation systems (stationary systems or UT&S REMA® systems). In addition, there are frequently more concentrated process baths, semi-concentrates and eluates, which have to be detoxified and neutralised in batch mode. The wastewater containing cadmium which is generated by the photovoltaic industry, for example, can be treated with the aid of the REMA® system.

For wastewater containing cadmium, the regulations in some countries (such as Germany) require that the treatment and disposal of this water must be kept completely separate from the treatment and disposal of other wastewater. The CHRIST subsidiary UT&S in Birkenfeld, near Pforzheim, operates both an officially approved regeneration system for cadmium and an approved wastewater system for cadmium. This means that we can offer our customers an optimum solution for every requirement. We can also offer optimised solutions tailor-made to meet your requirements for the treatment of other types of water and wastewater, and we can even develop new systems for you in our R&D departments.





Contact us: we have a suitable solution for every problem.

The CHRIST Group offers systems for process-water treatment, wastewater treatment, recycling and recovery of valuable substance from a single source. CHRIST is thus the ideal partner for the manufacturers of photovoltaic elements. New technologies, such as those in the solar-cell production, demand innovative processes for water management and for the recovery of

valuable substances. We continually carry out research and development in order to improve the efficiency of our recovery processes. This improves the quality of the wastewater, reduces the pollution of the environment, increases the amount of process water and valuable substances which can be recovered and, in the end effect, reduces your operating costs.



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