NEWS LETTER

INSTITUTION OF INCORPORATED ENGINEERS, SRI LANLA - UAE BRANCH

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"Do not dwell in the past; do not dream of the future, Concentrate the mind on the Present Moment"

- Load Buddha –

WISH YOU ALL A PEACEFUL POSON FESTIVAL.....!!!

Helping Hand to Flood Victims

"IIESL – UAE Branch contributed AED 3,000.00 for the flood relief fund organized by the Consul General office of Sri Lanka for Dubai & Northern Emirates in the UAE, as a CSR; Date 27.05.2016"

VESAK FESTIVAL IN DUBAI

Representing IIESL-UAE Branch, Chairman Eng. Sunil Hettiarachchi lighting the traditional oil lamp

10th Annivesary Celebrations of the Institution of Incorporated Engineers Sri Lanka UAE Branch

UAE Branch will proudly be celebrating its 10th Anniversary this year with its members. Celebrations will take place together with the Annual Sessions and the AGM in October 2016

AGM 2015-2016

Institution of Incorporated Engineers, Sri Lanka

The Annual Sessions and AGM of the Institution of Incorporated Engineers, Sri Lanka will be held at the Sri Lanka, Foundation, Independence Avenue, Colombo 07 on the 23rd of July 2016 at 2.30 pm. His Excellency Maithripala Sirisena is expected to grace the occasion as chief guest for the annual sessions.

IIESL-UAE Branch kindly request its members to take part in this sessions. As informed by the IIESL, the seating capacity is limited. Confirmation of your participation is required on or before the 30th of June 2016 for the reservation of your seat. Please contact Executive Secretory of the IIESL - iie@sltnet.lk

Art of Tendering

Above CPD will be reorganized in Dubai in near future as to respond to the continuing demand from the professionals in the region will be conducted by veteran past chairmen of IIESL – UAE Branch, Engineers Dhammika Gamage and Hemantha Jayasree.

A Professional:

- Has specialized skills and knowledge
- Has acquired such knowledge and skills through a long period of training and study, and continues to maintain and update them through professional life
- Has, as a result of this specialized expertise, significant power to affect individual client and wider society
- Belongs to a professional body which regulates their practice
- And as a part of that self-regulation adheres to ethical principles which the professional body oversees.

Reference: The Royal Academy of Engineering (2011) *Engineering ethics in practice: A guide for engineers* [Online] Available from; http://www.raeng.org.uk/publications/other/

DARK SIDE OF BRIGHT SUNSHINE POWER

Solar energy is an essential part of the global move towards clean energy, and it is critical that the growing photovoltaic industry is itself truly safe and sustainable. Diminutive attention is required to the potential risks and hazards involved with the production of crystalline Silicon (c-Si) wafers, the fundamental raw material for production of PV cells. The solar PV industry must address these issues immediately, or risk repeating the mistakes made by the microelectronics industry.

Solar panels come in three basic types, which vary in efficiency and cost:

1) **Monocrystalline**: made of thin slices of silicon, cut from a single crystal
2) **Polycrystalline**: made from thin slices of silicon, cut from a block of crystals
3) **Hybrid**: combining crystalline cells with a thin layer of silicon on a glass or metal base. This tends to be the most efficient type of solar cell

Principal raw material for PV cells, Silicon (Si) is the second most abundant element next to oxygen contains 27.7% of earth's crust.

Production of c-Si wafers begins with the mining of silica, found in the environment as sand or quartz. Silica is refined at high temperatures to remove the oxygen and produce metallurgical grade silicon, which is approximately 99.6% pure. However, silicon for semiconductor use must be much purer.

The higher temperatures required for c-Si production make it an extremely energy intensive and expensive process, and also produces large amount of waste. As much as 80% of the initial metallurgical grade silicon lost in the process.

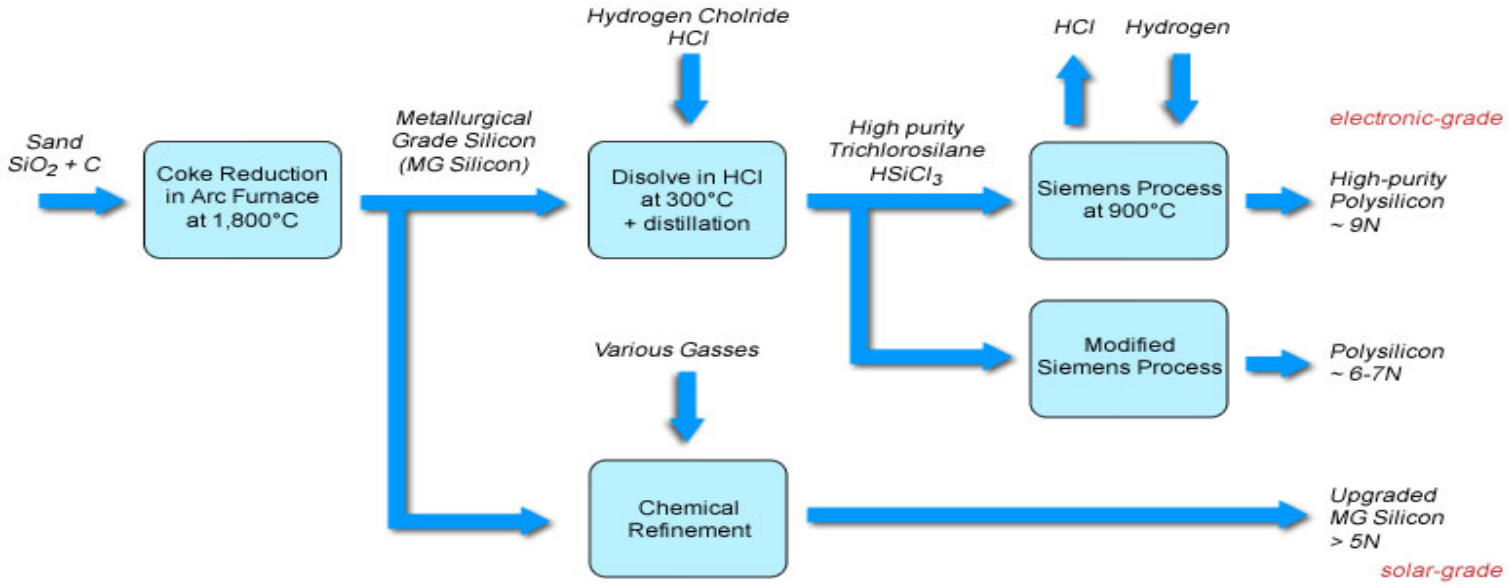
Higher purities are achieved through a chemical process that exposes metallurgical grade silicon to hydrochloric acid and copper to produce trichlorosilane gas. The trichlorosilane is then distilled to remove remaining impurities, which typically include chlorinated metals of aluminum, iron and carbon. It is finally heated or "reduced" with hydrogen to produce silane gas. The silane gas is heated again to make molten silicon, used to grow monocrystalline silicon crystals or used as an input for amorphous silicon to produce monocrystalline or multicrystalline silicon, which are extremely pure (from 99.99999% to 99.9999999%), which is ideal for microchips, but far more than required by the PV industry.

The use of silane gas is the most significant hazard in the production of c-Si because it is extremely explosive and presents a potential danger to workers and communities.

Sawing c-Si wafers creates a significant amount of waste silicon dust called kerf, may generate silicon particulate matter that will pose inhalation hazards for personnel involved with.

The production of silane and trichlorosilane results in waste silicon tetrachloride, an extremely toxic substance can constitute an extreme environmental hazard.

The extremely potent greenhouse gas sulfur hexafluoride is used to clean the reactors used in silicon production. One ton of sulfur hexafluoride has a greenhouse effect equivalent to that of 25,000 tons of CO_2. It can react with silicon to make silicon tetrafluoride and sulfur difluoride, or be



reduced to tetrafluorosilane and sulfur dioxide. Sulfur dioxide releases can cause acid rain.

It is imperative that a replacement for sulfur hexafluoride be found, because accidental or fugitive emissions will greatly undermine the reductions in greenhouse gas emissions gained by using solar power.

New technologies are being developed to significantly reduce energy consumption and to make thinner wafers - microcrystalline Si and nanocrystalline Si - that use less silicon, but these require manufacturing techniques from nanotechnology that may pose new kinds of occupational risks. (Solar Industry – 2015 [Online]).

Research and developments are ongoing, third generation PV cell production is on the way and improvements on Potential Induced Degradation (PID) on c-Si based solar PV cells is the another sector that scientist are currently researching on. (GINTECH 2015 [Online])

REFERENCE

- Solar Industry 2000 – 2015, *Hazardous Materials Used In Silicon PV Cell Production* [Online]. Available from: http://www.solarindustrymag.com/issues/SI1309/FEAT_05_Hazardous_Materials_Used_In_Silicon_PV_Cell_Production_A_Primer.html, [Accessed 10.12. 2015]Author

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