

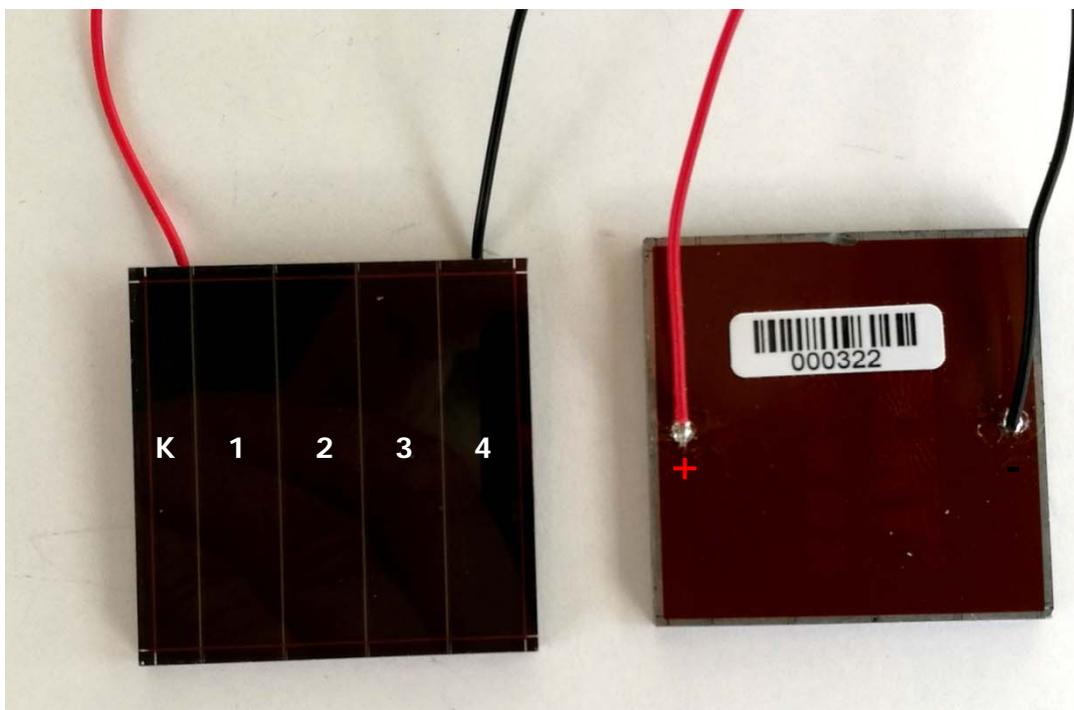
**Photovoltaik-
System
SUSE**

innovative Solarsysteme für Schule und Ausbildung

**Solarthermiesystem
Wärme von der Sonne**



Solarmodul aSi (amorphes Silizium) mit 4 Solarzellen in interner Reihenschaltung



Vorderseite

Rückseite mit + und - Kabel

K = Kontaktierungszone 1...4 = Solarzellen 1-4 in interner Reihenschaltung

Technische Daten:

bei

S = 1000 W/m²

T = 25°C

AM 1,5

Maße:

35,5 x 35,5 x 3,2 mm, Glasträger

Leerlaufspannung:

3,2 V

Kurzschlussstrom:

28 mA

Spannung im MPP:

2,0 V

Strom im MPP:

19,6 mA

Material:

Dünnschicht, amorphes Silizium

Aufbauzeichnung und Beschreibung siehe Rückseite

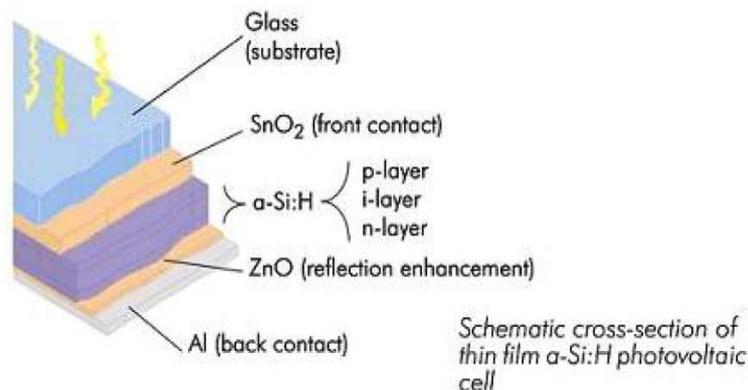
Experimente:

1. Betrieb einer (roten) LED am Modul ohne Vorwiderstand
2. Reihenschaltung mehrerer Module
3. Parallelschaltung mehrerer Module
4. Betrieb eines Solarmotors nur bei Parallelschaltung von 3-4 Modulen

Amorphous Silicon Thin Film Technology

Amorphous silicon (a-Si) is the non-crystalline form of silicon. The material can be alloyed with hydrogen to form hydrogenated amorphous silicon (a-Si:H) resulting in a significantly lower number of defects and hence a practical material for semi-conductive device applications, including photovoltaic.

Amorphous silicon photovoltaic modules are made with thin layers of a-Si:H on a conductive substrate. Amorphous silicon-based thin-film photovoltaic modules were invented in 1976, and have since been successfully used in a wide range of solar battery applications for several decades. Here is a typical module structure:



There are several key advantages to a-Si:H based thin-film PV modules. First, a-Si thin-film can be deposited onto a variety of substrates at relatively low temperatures, presenting many interesting application opportunities. Second, a-Si thin film can be deposited over large areas by PECVD (plasma enhanced chemical vapor deposition) technology. Third, a-Si thin film modules use silicon, which is abundant and environmental friendly, as compared to the materials needed for other thin film technologies.

Thin-film based PV modules offer a great opportunity to reduce manufacturing costs.

One reason is that very little material is needed for each module. The energy consumed in the thin film PV manufacturing process is significantly less than that consumed in the crystalline silicon PV module manufacturing process. In addition, thin film PV modules are significantly thinner than conventional crystalline solar PV modules. As a result, the silicon materials used in thin film PV module manufacturing are only approximately 1% to 2% of those used to produce crystalline