

High Performance Metal Solutions

Thin Film Materials for the Solar Energy Market

H.C.Starck 

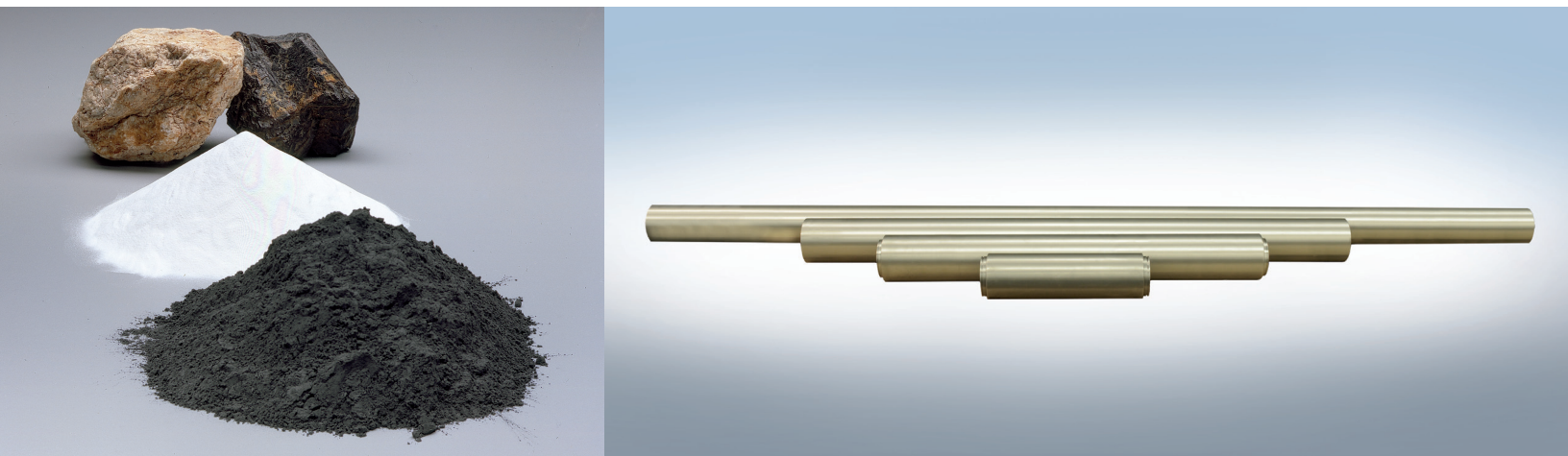
High Performance Metal Solutions

High Tech Materials for High Tech Applications

H.C. Starck has decades of experience in the production of high performance materials that provide solutions to demanding solar applications.

- > Molybdenum
- > Tungsten
- > Tantalum
- > Titanium
- > Niobium
- > Molybdenum alloys
- > Tungsten alloys
- > Nickel alloys

H.C. Starck is vertically integrated in the production of refractory metals from inorganic chemicals to finished products.



Refractory metals have special properties for thin film applications:

- > conductive but not magnetic and are easily sputtered
- > resistant to the harsh etchants used in device manufacturing
- > adhesion to substrates and subsequent layers is generally good
- > resistant to the diffusion of impurities
- > coefficients of thermal expansion that are similar to silicon
- > low residual stress (at optimum sputter conditions)

Value-Added Product Solutions for the Solar Energy Market

The solar energy market has come of age. As the costs of fossil fuels skyrocket, the photovoltaic (PV) solar energy industry is predicted to enter a period of explosive growth. Experts in the field predict that larger and more efficient PV panels will be the norm as solar energy producers strive to reduce production costs.

Thin-film PV, which up until a few years ago was a much smaller segment of the PV industry, is now one of the most vibrant areas of the market.

H.C. Starck continues to play a significant role in this market. We manufacture rotary and planar sputtering target materials made of high-purity molybdenum for CdTe and CIGS based solar cells, and rotary NiV targets used for Si thin-film solar cells. We also produce target materials from titanium, niobium, and other materials. As the PV solar cell market changes, H.C. Starck will continue to be a leader. We conduct active research into new solar cell thin film materials technologies and we continue to expand our capabilities to produce rolled and machined plates and tubes.

Material	Potential PV Applications	Tubular	Planar
Mo	CIGS, CdTe, a-Si	✓	✓
Mo-Ti	Barrier Layer	✓	✓
W	Barrier Layer	✓	✓
WTi	Barrier Layer	✓	✓
NiV	CdTe, a-Si	✓	✓
Nb	Various	✓	✓
Ta	Barrier Layer	✓	✓



USA

H.C. Starck Inc.

21801 Tungsten Road
Euclid, OH 44117-1117 USA
T +1 216 692 3990
F +1 216 692 0029

H.C. Starck Inc.

45 Industrial Place
Newton, MA 02461 USA
T +1 617 630 5800
F +1 617 630 5879

H.C. Starck Inc.

460 Jay Street
Coldwater, MI 49036 USA
T +1 517 279 9511
F +1 517 269 9512

United Kingdom

H.C. Starck Ltd.

1 Harris Rd.
Calne, Wiltshire SN11 9PT UK
T +44 1249 822 122
F +44 1249 823 800

Germany

H.C. Starck Hermsdorf GmbH

Robert-Friese-Straße 4
Hermsdorf, Germany 07629
T +49 36601 922 0
F +49 36601 922 111

Japan

H.C. Starck Fabricated Products GK

3F Shiodome Building,
1-2-20 Kaigan,
Minato-ku, Tokyo
105-0022 JAPAN
T +81-3-6721-8177
F +81-3-6733-8896

Korea

H.C. Starck GmbH Korea Branch

7F, 437 Teheran-ro
Gangnam-gu
Seoul, Korea 06158
T +82 2 538 0740
F +82 2 538 2031

Taiwan

H.C. Starck GmbH Branch Office Taiwan

Room 1307, 13F, No. 88, Sec. 2,
Zhongxiao E. Rd., Zhongzheng Dist.,
Taipei City 100, Taiwan ROC
T +886 2 2393 3337
F +886 2 2393 2083

China

H.C. Starck Specialty Materials (Taicang) Co., Ltd.

Taicang Zhongyu Science Park
No.111 N. Dongting Rd of Taicang
Taicang City Jiangsu Province 215400
T +86 512 5318 8278
F +86 512 5318 8282

India

H.C. Starck (India) Pvt. Ltd.

Level 2 Raheja Centre Point
294 CST Road Near
Mumbai University Off Bandra-Kurla
Complex, Santacruz (E)
Mumbai, Maharashtra 400 098 India
T +91 72 5917 7599
F +91 22 6162 3086

H.C. Starck (India) Pvt. Ltd.,

#148, Prestige Featherlite Tech Park,
2nd Phase, EPIP Zone, Whitefield,
Bangalore – 560 066
T +91 7259177599

DPAP 08/19

The conditions of your use and application of our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis at least must include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by H.C. Starck Solutions. All information is given without warranty or guarantee. It is expressly understood and agreed that the customer assumes and hereby expressly releases H.C. Starck Solutions from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance and information. Any statement or recommendation not contained herein is unauthorized and shall not bind H.C. Starck Solutions. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent. Properties of the products referred to herein shall as general rule not be classed as information on the properties of the item for sale. In case of order please refer to issue number of the respective product data sheet. All deliveries are based on the latest issue of the product data sheet and the latest version of our General Conditions of Sale and Delivery.

The values in this publication are typical values and do not constitute a specification.