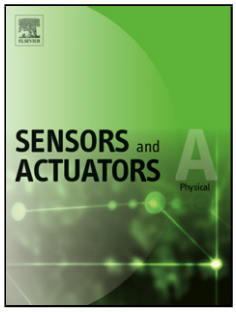

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Author: Tobias Frischmuth Michael Schneider Daniel Maurer<ce:author id="aut0020" biographyid="vt0020" orcid="0000-0003-3963-6295"> Thomas Grille Ulrich Schmid

PII: S0924-4247(16)30276-X
DOI: http://dx.doi.org/doi:10.1016/j.sna.2016.05.042
Reference: SNA 9692

To appear in: *Sensors and Actuators A*

Received date: 30-11-2015
Revised date: 26-5-2016
Accepted date: 31-5-2016

Please cite this article as: Tobias Frischmuth, Michael Schneider, Daniel Maurer, Thomas Grille, Ulrich Schmid, Inductively-coupled plasma-enhanced chemical vapour deposition of hydrogenated amorphous silicon carbide thin films for MEMS, Sensors and Actuators: A Physical http://dx.doi.org/10.1016/j.sna.2016.05.042

Inductively-coupled plasma-enhanced chemical vapour deposition of hydrogenated amorphous silicon carbide thin films for MEMS

Tobias Frischmuth[1], Michael Schneider[1], Daniel Maurer[2], Thomas Grille[2], Ulrich Schmid[1]

1 TU Wien, Institute for Sensor and Actuator Systems, Gusshausstrasse 27-29, 1040 Vienna, Austria.

2 Infineon Technologies Austria AG, Siemensstraße 2, 9500 Villach, Austria

Corresponding author:

Tobias Frischmuth, TU Wien, Institute for Sensor and Actuator Systems, Gusshausstrasse 27-29, 1040 Vienna, Austria.

Tel.: +43(1) 58801 36647;

Fax.: +43(1) 58801 36698;

Email: tobias.frischmuth@tuwien.ac.at

Abstract

In this study, the impact of various deposition parameters such as the reactive gas flow ratio, plasma power, substrate temperature and chamber back pressure of ICP-CVD deposited a-SiC:H thin films is investigated and the influence on important MEMS-related properties like residual stress, Young's modulus, hardness, mass density and refractive index is evaluated. Basically, tailoring of the as-deposited a-SiC:H characteristics is possible to a great extent with residual stress values ranging from -16 up to -808 MPa, Young's modulus values between 36 and 209 GPa or deposition of layers with hardness values ranging from 5.3 to 27.2 GPa is feasible. Especially the mechanical parameters are strongly linked to both the Si-C bond density and the amount of incorporated hydrogen obtained from Fourier transform infrared spectroscopy analyses.