

## Dust particle formation in argon-acetylene plasmas and interaction with (extreme) ultraviolet radiation

**Citation for published version (APA):**

Wetering, van de, F. M. J. H., Nijdam, S., & Kroesen, G. M. W. (2012). *Dust particle formation in argon-acetylene plasmas and interaction with (extreme) ultraviolet radiation*. 59 (P24)-59. Poster session presented at 24th NNV Symposium on Plasma Physics and Radiation Technology, March 6-7, 2012, Lunteren, The Netherlands, Lunteren, Netherlands.

**Document status and date:**

Published: 01/01/2012

**Document Version:**

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

**Please check the document version of this publication:**

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.tue.nl/taverne](http://www.tue.nl/taverne)

**Take down policy**

If you believe that this document breaches copyright please contact us at:

[openaccess@tue.nl](mailto:openaccess@tue.nl)

providing details and we will investigate your claim.

# 24<sup>th</sup> SYMPOSIUM

## PLASMA PHYSICS & RADIATION TECHNOLOGY



Dutch Physical Society  
Section Plasma and Gas Discharge Physics  
&  
Research school  
Center for Plasma Physics and Radiation Technology



Nederlandse Natuurkundige Vereniging

March 6 & 7 / 2012    CongresHotel De Werelt - Lunteren

## **Dust particle formation in argon-acetylene plasmas and interaction with (extreme) ultraviolet radiation**

F.M.J.H. van de Wetering, S. Nijdam, G.M.W. Kroesen  
*Eindhoven University of Technology, Department of Applied Physics, P.O. Box 513,  
5600 MB Eindhoven, The Netherlands*

In extreme ultraviolet (EUV) lithography, ionic and particulate debris coming from the plasma source plays an important role. We started up a project looking more fundamentally at particulate formation in plasmas and the interaction with EUV radiation. To this end, we study a capacitively-coupled radio-frequency (13.56 MHz) argon-acetylene plasma.

In low-pressure hydrocarbon plasmas dust particles spontaneously form under certain conditions. The whole process occurs in a matter of seconds to minutes after igniting the plasma and results in a cloud of particulates up to micrometer sizes levitating in the plasma.

Our aluminum cylindrical discharge chamber also serves as a resonant cavity for low-power microwave (2 – 8 GHz) signals. The frequency at which resonance occurs is a measure for the free-electron density of the plasma.

We present preliminary results on the temporal evolution of the electron density during dust particle formation up to several minutes after plasma ignition. Furthermore, we present an overview of approaches for future research predominantly aimed at the interactions in a more EUV-like environment.