

Berichte aus der Chemie

Hans-Detlef Luginsland

**A Review on the Chemistry and the
Reinforcement of the Silica-Silane Filler System
for Rubber Applications**

Shaker Verlag
Aachen 2002

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Luginsland, Hans-Detlef:

A Review on the Chemistry and the Reinforcement of the Silica-Silane Filler System for Rubber Applications / Hans-Detlef Luginsland.

Aachen : Shaker, 2002

(Berichte aus der Chemie)

ISBN3-8322-0950-6

Copyright Shaker Verlag 2002

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 3-8322-0950-6

ISSN 0945-070X

Shaker Verlag GmbH • P.O. BOX 101818 • D-52018 Aachen

Phone: 0049/2407/9596-0 • Telefax: 0049/2407/9596-9

Internet: www.shaker.de • eMail: info@shaker.de

**A REVIEW ON THE CHEMISTRY AND THE REINFORCEMENT
OF THE SILICA-SILANE FILLER SYSTEM
FOR RUBBER APPLICATIONS**

Hans-Detlef Luginsland
Degussa AG, Advanced Fillers and Pigments Division
Applied Technology Advanced Fillers

This booklet reviews the chemistry of sulfur and vinyl functionalized triethoxysilyl silanes and the reinforcement of silica-silane-filled rubber compounds. This review includes the reaction of the silane with the silica surface during mixing as well as the coupling reaction with the polymer under vulcanization conditions. These two reactions have certain consequences for the processing of such rubber compounds, e.g. temperature, time, mixing device type of silica and type of silane. Furthermore the formation of the silica-rubber network in the vulcanizate and the resulting rubber performance are discussed. The results give an indication for the optimal use of such silanes in different rubber applications and are the key for further compound optimization. Several model formulations are included.