

DuPont™ CuSolve™ EKC® 590 and 590S Removers

Technical Application Note

Qualified and Proven Solutions for Copper Cleaning

Introduction

DuPont™ EKC® 590 and EKC® 590S post etch residue removers are aqueous cleaning solutions designed specifically to address TiN metal hard mask removal in situ during cleaning. The product is provided as a concentrate which is activated by the addition of hydrogen peroxide at point of use. Peroxide concentration, process temperature, and process time enable a controlled, selective and tunable removal of TiN metal hard mask in situ during the clean process. The product is qualified for below 14 nm Cu Dual-Damascene application.

Cleaning Performance

- Complete removal of etch polymer residues
- Complete removal of Ti F residues and Cu oxides
- Compatible with low-k (such as SiOC, k=2.5) and Cu

Cu Compatibility

Excellent compatibility with Cu
(demonstrated on polished Cu plug structure)

Etch Rates for Various Materials

- Process Temp: 50 °C
- With 60% Peroxide added

Substrate	EKC® 590 Etch Rate (Å)/min
PVD TiN	199.9
Al ₂ O ₃	2.1
AlN	5.8
Cu	2.9
Co	0.18

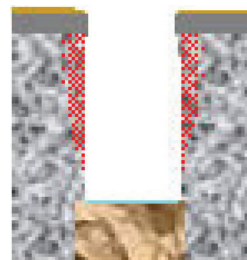
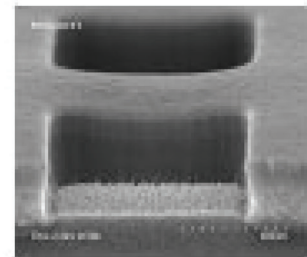
Material Compatibility

EKC® 590 (activated with peroxide) and EKC® 590S have been tested at 50 °C and are compatible with PFA, PP, PVC, PTFE, and PVDF.

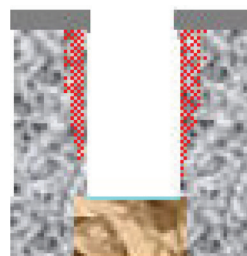
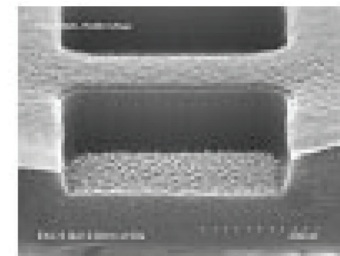
Illustrations of TiN Removal and Cleaning Performance



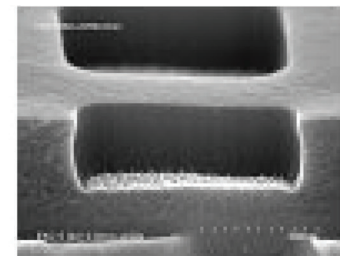
Pre-Clean



Post Clean EKC® 590–TiN Pull Back



Post Clean EKC® 590–TiN Removed



Physical and Chemical Properties

Parameter	EKC® 590 No Peroxide	EKC® 590 With Peroxide
pH	8.7–9.5	8.0
Flash Point (°C)	NA	NA
Surface Tension (dynes/cm, 24 °C)	65.1	NA
Freezing Point (°C)	-3.0	NA
Density (g/mL)	1.02	NA

Pot-Life And Shelf Life

- Typical pot-life is 6 hours when peroxide is added
- Shelf life is one year from date of manufacture

Safety

EKC® 590 is a clear liquid with no odor and is non-corrosive. Exposure to the eyes causes irritation, and exposure to the skin and respiratory tract may cause irritation. For further information please refer to the MSDS.



ekctech.dupont.com

For more information on DuPont™ CuSolve™ EKC® or other DuPont products, please visit our website.

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CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Medical Caution Statement," H-50102-5 and "DuPont Policy Regarding Medical Applications" H-50103-5.

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EI-10105 (10/19)