Entegris

REGENSI® 31

Silicon process efficiency

Overview

RegenSi® 31 silicon process efficiency solutions offer compelling value propositions focused on reducing the overall cost of silicon for manufacturers. RegenSi 31 is adept at removing most films commonly used in the industry at a higher rate than commodities, such as dilute HF, while leaving the Si wafer surface extremely smooth. This high selectivity for metal and non-metal films over the silicon substrate enables the minimization, and possible elimination, of wafer polishing. By minimizing polish-induced silicon loss, wafers can be re-used more times, resulting in substantial cost savings.

Product Selection

RegenSi 31 is the baseline wafer reclaim product. Entegris also offers a variety of specialized products tuned to various customer needs. The selection of the optimum product is determined by the type of films to be etched, the operating parameters that are most desired for the etch requirements, and material selectivity desired.

Applications

- Wafer reclaim
  - TEOS
  - OSG: Coral, Black Diamond™, Aurora™
  - FSG
  - SiN, TiN, TaN
  - Metals: Cu, Al, Ta, Ti
- Backside and bevel edge clean
- Product wafer rework

Advantages

- Reduced process times
- High dielectric-selective etch rates
- Minimizes Si roughening
- Minimizes need for post-clean CMP

Usage

RegenSi 31 wafer reclaim solutions products are formulated as ready-to-use solutions; no dilution of the products is required or recommended. The products can to be used in either batch immersion, batch spray or single wafer applications, and can often be implemented as a simple drop-in alternative to products currently in use.

Handling, Storage and Packaging

Before using this product, read the MSDS. RegenSi 31 products are available in 1-gallon and 55-gallon packages.

Material Compatibility

INCOMPATIBLE MATERIALS @ 40°C/28 DAYS

Viton®	Quartz	316 Stainless Steel
Silicone rubber		

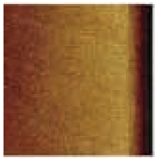
COMPATIBLE MATERIALS @ 40°C/28 DAYS

Chemraz®	Teflon®	EPR O-rings
PVC (white)	Polypropylene	HDPE
PVDF	PFA	Polycarbonate

Performance Data

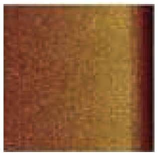
RegenSi 31 AFM Samples

Bare Si Pre
RMS = 0.145 nm



Bare Si post
15 min @ 40°C
RMS = 0.144 nm

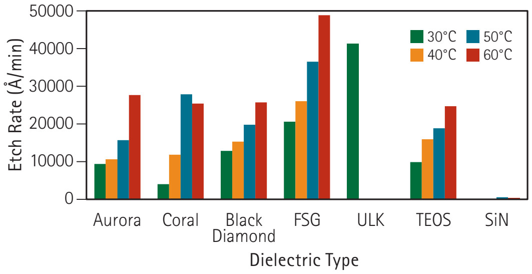
Bare Si Post BD etch
15 min @ 40°C
RMS = 0.204 nm



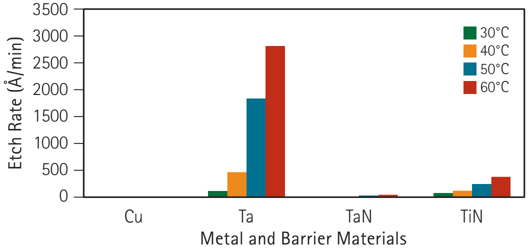
Bare Si Post Coral™ etch
15 min @ 40°C
RMS = 0.274 nm

AFM images show little to no roughening of the Si surface after treatment with RegenSi 31.

Dielectric Etch Rate of RegenSi 31



Metals and Barrier Materials Etch Rate of RegenSi 31



Chemical Compatibility

Chemical	Color	Temp. on Mixing
Acetone	NC	+7°C
IPA	NC	+3°C
N-methylpyrrolidinone	NC	+24°C
Monoethanolamine	Yellow	+83°C
Propylene glycol	NC	+3°C
Water	NC	+4°C
Alkyl ammonium hydroxide	NC	+30°C
Hydrogen peroxide (30%)	NC	+2°C
Sulfuric acid (40%)	NC	NC
Hydroxyl amine (50%)	NC	+55°C

NC = no change; ambient temperature = 24°C

Process Recommendations

	Batch Process	Single Wafer
Operating temperature:	≤60°C depending on desired etch rate	
Process time:	Dependant on dielectric thickness and processing temperature	
Rinse:	Perform standard high-flow cascade rinse of wafers due to potential for hydrogen terminated Si surface (hydrophobic)	Perform standard rinse process used for hydrophobic surfaces
Dry:	Recommended use of Marangoni drying (IPA dryer) if available	Perform standard dry process used for hydrophobic surfaces

Note: For wafer reclaim applications, customized recipes may be needed to meet application-specific requirements. Contact Entegris for assistance in adjusting process variables (time, rpm, dilution, etc.). Adjusting these variables can optimize performance and cost-of-ownership.

For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit *www.entegris.com* and select the Customer Service link for the center nearest you.

Terms and Conditions of Sale

All purchases are subject to Entegris' Terms and Conditions of Sale. To view and print this information, visit *www.entegris.com* and select the Legal Notices link from the footer.

Entegris®, the Entegris Rings Design®, Creating a Material Advantage® and RegenSi® are registered trademarks of Entegris, Inc.
Aurora™ is a trademark of ASM.
BlackDiamond™ is a trademark of AMAT.
Chemraz® is a registered trademark of Greene, Tweed and Co.
Coral™ is a trademark of Lam Research Corporation.
Teflon® and Viton® are registered trademarks of E. I. du Pont de Nemours and Company.

ENTEGRIS, INC.
Corporate Headquarters | 129 Concord Road | Billerica, MA 01821 USA
Customer Service Tel. +1 952 556 4181 | Customer Service Fax +1 952 556 8022
In North America 800 394 4083 | *www.entegris.com*

Entegris
creating a material advantage