Bevel Polishing System for Semiconductor Devices

by Masunobu ONOZAWA

A bevel polishing system, the EAC 300bi-hp, has been released into the market to answer demands in the semiconductor for higher throughput, footprint shrinkage, and lower cost of consumables (CoC). This unprecedented flexible system upgrades the former model, the EAC 300bi-T, which is attaining a boost in the yield of mass produced semiconductor devices. In particular, this system enables a 3.3 time increase in throughput, a 16% reduction in footprints, and about a 70% reduction in CoC, compared to the same by conventional such systems.

Keywords: Wafer edge, Wafer bevel, Bevel polishing, Immersion lithography, Wafer thinning, Knife-edge, Edge bead, Etching, Edge exclusion, High-K

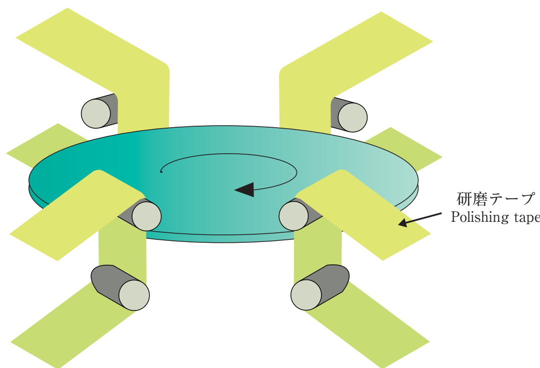

図 1　研磨プロセス
Fig. 1　Polishing process

表　現行装置と新型装置との比較
Table　Comparison between current system and new system

	現行装置　EAC300bi-T Current system	新型機　EAC300bi-hp New system
設置面積 Footprint	100※	84
スループット Throughput	100※	330
CoC	100※	30

※現行機を 100 とした場合の比較
Comparison in case of current system be taken as 100

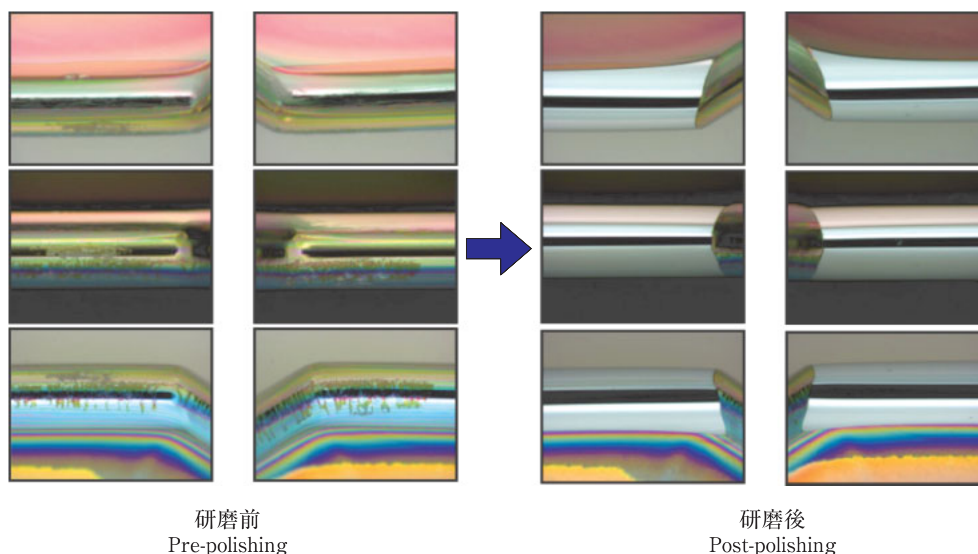

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写真 1　ベベル研磨適用例
Photo 1　Example of bevel polishing application

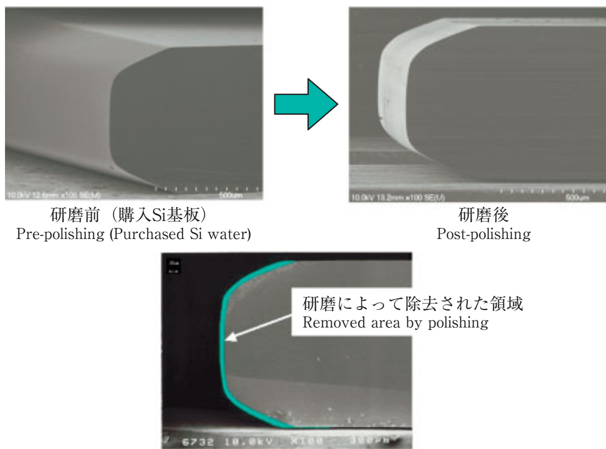

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写真2　ベベル研磨前後の断面形状比較

Photo 2　Comparison in shape pre-polishing and post-polishing

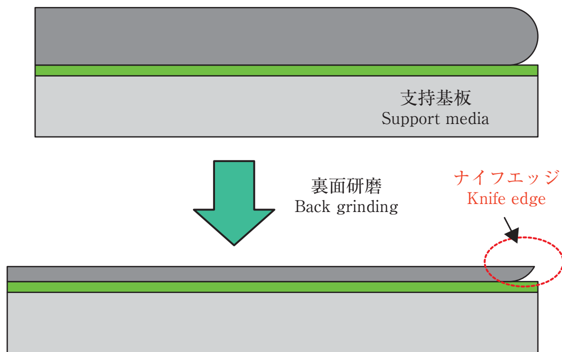

図2　ナイフエッジ発生例

Fig. 2　Example of knife edge defect

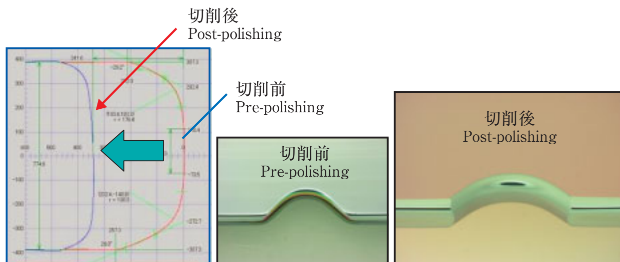

図3　全ベベル切削適用例

Fig. 3　Example of removal in entire bevel area by EAC

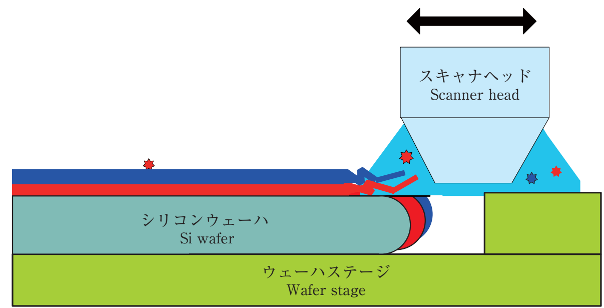

図4　液浸リソグラフィにおいて懸念されるデフェクト汚染

Fig. 4　Defect issue in immersion lithography

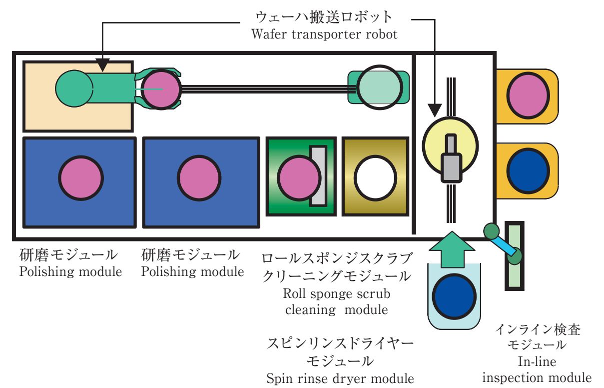

図5　装置構成

Fig. 5　Configuration

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写真3　装置外観

Photo 3　Tool overview

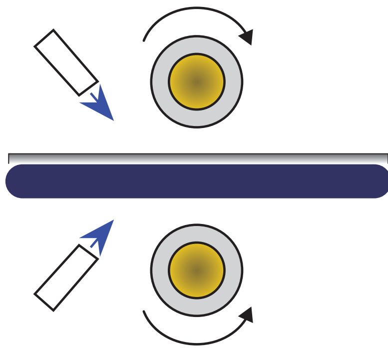

図 6　ロールスポンジ形スクラブ洗浄モジュール
Fig. 6　Roll sponge scrub cleaning module

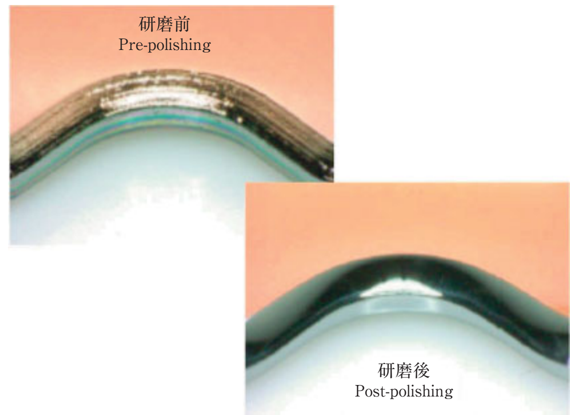

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写真 5　ノッチ研磨後の表面状態
Photo 5　Comparison between pre- and post-polishing notch surfaces

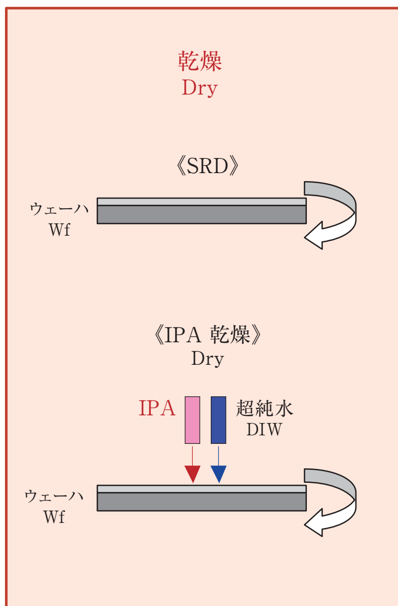

図 7　スピンリンスドライヤモジュール
Fig. 7　Spin rinse dryer module

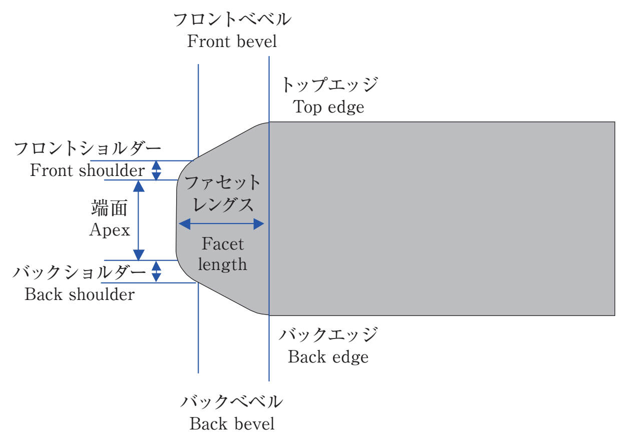

図 8　ウェーハ断面模式図
Fig. 8　Schematic of water cross section view

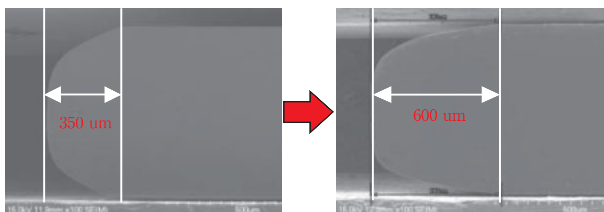

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写真 4　ベベル形状変更例
Photo 4　Example of bevel profile reshaping

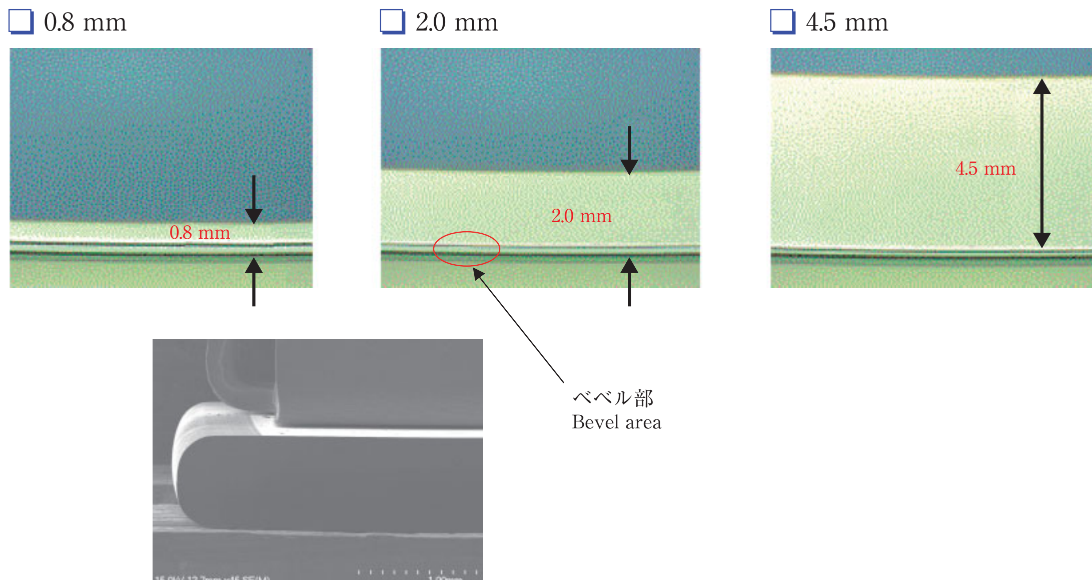

図9　トップエッジ研磨適用例
Fig. 9　Example of top edge polishing application