Fig. 1. A typical grinding wheel for silicon wafers.

D – wheel diameter;  W – rim width;  H – rim height
Wheel rpm
Chuck rpm
Rotation axis of wheel
Rotation axis of wafer
Feedrate

Fig. 2. Illustration of wafer grinding.
(a) Relatively consistent grinding force.

(b) Fluctuating grinding force.

Fig. 3. Consistent versus fluctuating force when grinding silicon wafers [6].
(a) Grinding force curve of a wheel without self-dressing ability.

(b) Grinding force curve of a wheel with self-dressing ability.

Fig. 4. Self-dressing ability indicated by grinding force curves [6].
Fig. 5. Compositions of a grinding wheel (after [20]).
Fig. 6. Illustration of wheel structure (after [20]).
(a) Abrasive grains are individually coated before forming the agglomerate.

(b) Plural grains are coated together before forming the agglomerate.

Fig. 7. Metal-coated abrasive (after [32]).
Fig. 8. Illustration of coating structure (after [31]).
Fig. 9. Grinding wheel with silica EPD pellets (after [36]).
Fig. 10. Grain size versus subsurface damage (SSD) in ground wafers (after [11]).
Fig. 11. Relation between grit size and maximum depth of cracks [12].
Fig. 12. Relationship between grain size and surface roughness when grinding ceramics (after [39]).
Fig. 13. Wheel wear mechanisms (after [47,23]).
Fig. 14. Bond systems for grinding wheels (after [26,37]).
Fig. 15. Relation between the pore volume percentage in the wheel and the surface roughness of the ground wafers (after [61]).
Fig. 16. Abrasive agglomerate.
Fig. 17. Pore formation in a vitrified-bond wheel (after [28]).
(Nc – rotational speed of chuck, Ns – rotational speed of wafer)

Fig. 18. Effects of wheel diameter on grinding mark curvature [8].
Fig. 19. Effects of wheel diameter on grinding mark depth [62].
Fig. 20. Illustration of center dimples on ground wafers (after [63]).