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Effect of cutting tool geometries on the ductile-brittle transition of monocrystalline sapphire

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# Highlights

- The coefficient of friction is directly related to stress distribution with different grit shapes
- The cutting depth for ductile-brittle transition increases with negative rake angle
- Larger apex angle leads to a smaller cutting depth for ductile-brittle transition due to higher thrust force
- The opening angle lower than  $180^\circ$  leads to a smaller cutting depth for ductile-brittle transition
- The increased truncated section results in a sharp decrease in cutting depth for ductile-brittle transition

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