Low stressed functional diamond films

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Status:
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Diamond films on Cobalt-Cemented Tungsten Carbide Twist Drills
- There is a thermal mismatch of diamond films on cobalt-cemented tungsten carbide (Co-WC) drills that leads to high stress.
- This mismatch occurs due to the poor adhesion of the film.
- Diamond coatings are desired due to high hardness and low friction, but suffer from adhesion problems, residual stresses, and a thickness threshold.
- Our unique method allows for an engineering design of drill edge geometry to allow diamond films to be deposited with low stress.

Advantages
- Technology allows for improved diamond deposition process, which results in stronger adhesion.
- Improved adhesion of the film produces lower stresses to thereby increase the drill lifetime.
- When compared to untreated drill bit, our drill bit was able to drill over 100 holes, whereas the untreated only drilled 40 holes before breaking.
  - Increased durability over 50%

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