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Samuel C. Bayham, Ronald Breault, Esmail Monazam

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Applications of tribology to determine attrition by wear of particulate solids in CFB systems

Samuel C. Bayham[1,2], Ronald Breault[1,*], Esmail Monazam[1,3]

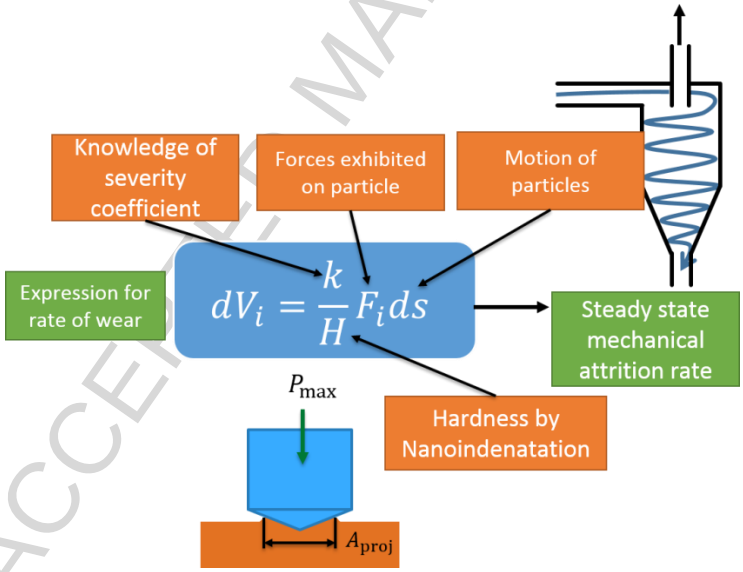
[1] National Energy Technology Laboratory; 3610 Collins Ferry Road, Morgantown, WV, USA 26507

[2] Oak Ridge Institute for Science and Education

[3] REM Engineering Services; 3537 Collins Ferry Road, Morgantown, WV, USA 26505

[*] Corresponding author: T: 304-285-4486 E: ronald.breault@netl.doe.gov

Graphical Abstract



Highlights

- Standpipe and cyclone attrition models derived for particulate solids
- Models depend on geometry, particle hardness, and solids velocity
- Particulate hardness derived from high temperature nanoindentation experiments
- Data from Reppenhagen and Werther for cyclone attrition fit model well

Abstract

In recent years, much attention has been focused on the development of novel technologies for carbon capture and chemicals production that utilize a circulating fluidized bed (CFB) configuration; examples include chemical looping combustion and circulation of temperature swing adsorbents in a CFB configuration for CO_2 capture. A major uncertainty in determining the economic feasibility of these technologies is the required solids makeup rate, which, among other