Article:
Abouhakim, H, Alizadeh Behjani, M, Quayle, MJ et al. (4 more authors) (2022) Comminution and amorphisation of Diaqua-bis(Omeprazolate)-Magnesium Dihydrate: An analysis of the energies involved. Powder Technology, 405. 117415. ISSN 0032-5910

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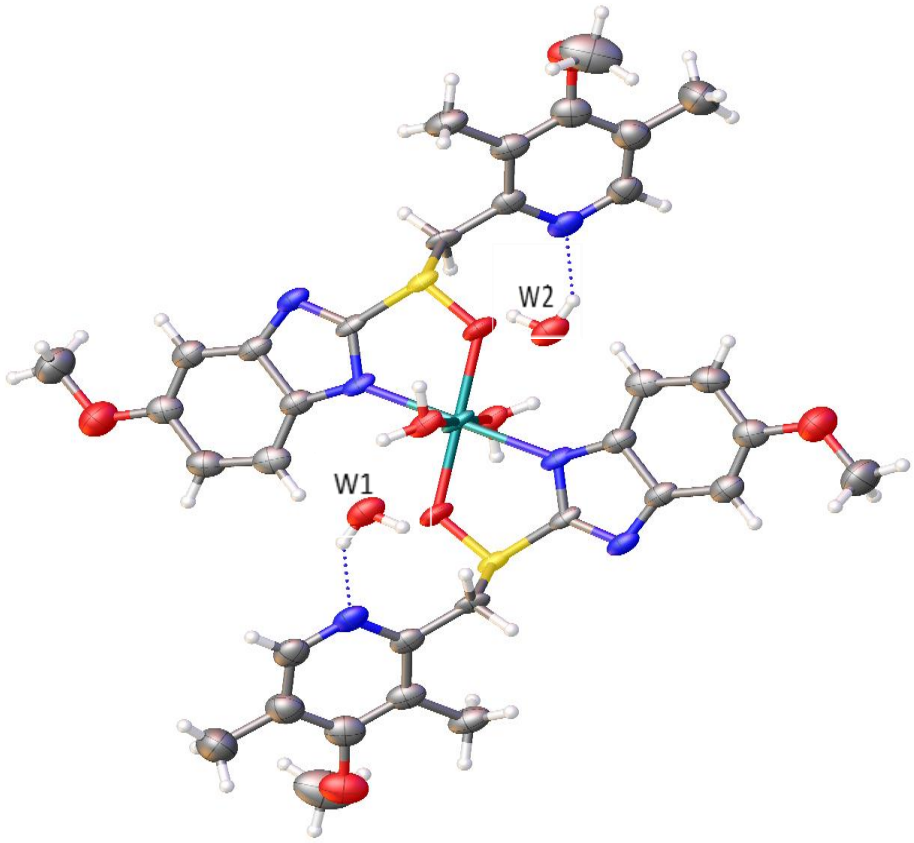


Figure 1: Molecular structure of diaqua-bis (Omeprazolate)-magnesium dihydrate (DABOMD). intermolecular hydrogen bonding between the molecules in the lattice shown in blue dotted lines Mg: green, S: yellow, N: blue, O: red, C: grey, H: white. Reproduced with the permission of the International Union of Crystallography (IUCr) [18]

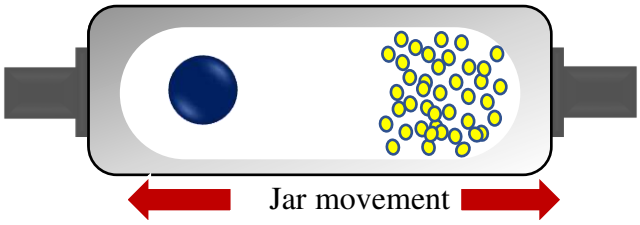


Figure 2: Schematic shows ball and powder motion in the single ball mill (modified from [9])

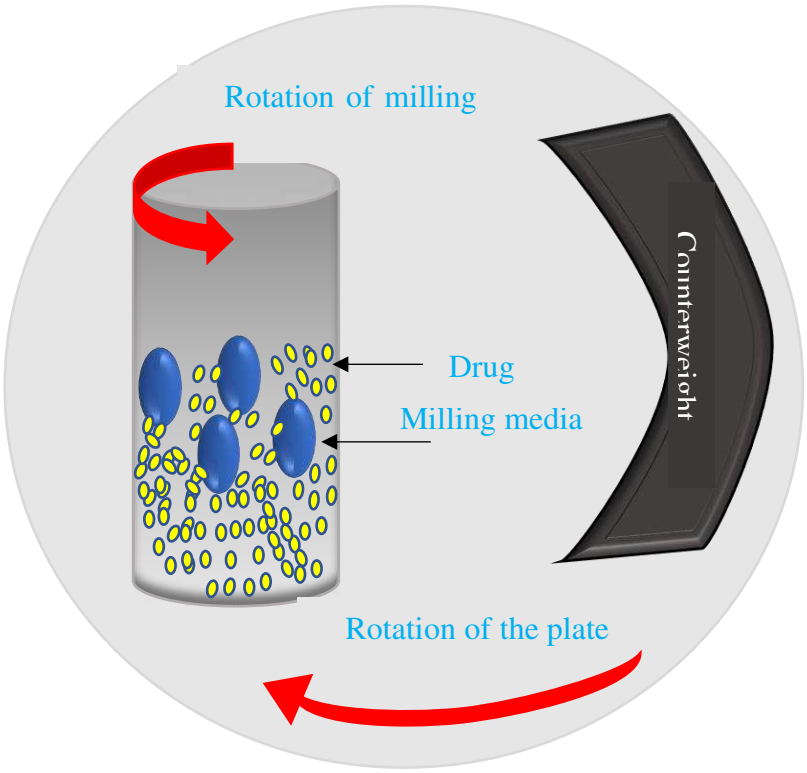


Figure 3: Schematic of a planetary ball mill ((Reproduced with the permission of American Chemical Society (ACS) [1]

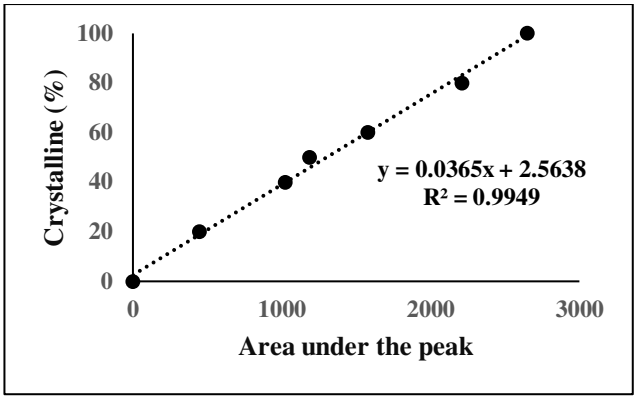


Figure 4: Calibrated Curve of the area under the curve of different ratios of standard crystalline and amorphous DABOMD measured by XRPD

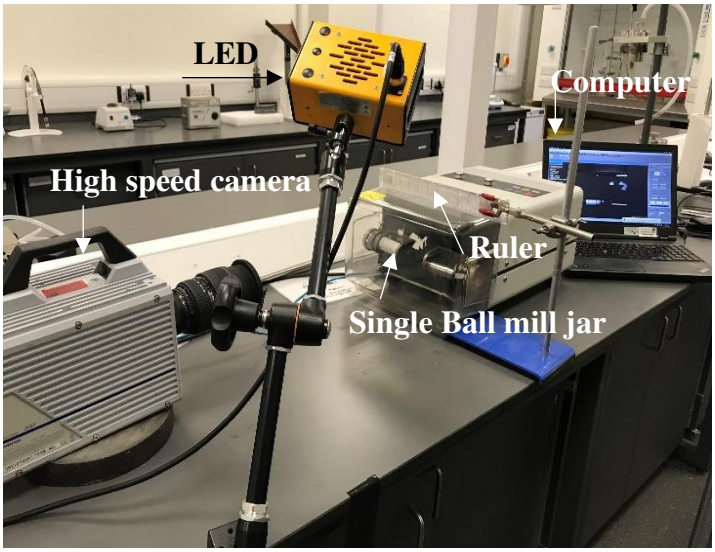


Figure 5: Experimental setup for measuring the speed of the milling jar in the single ball mill using high-speed Camera

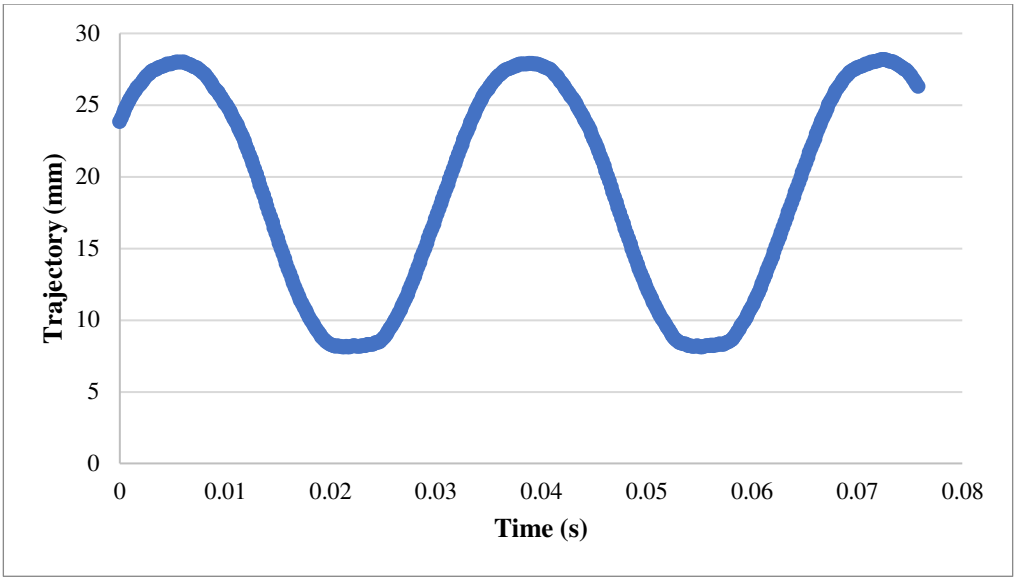


Figure 6: Trajectory of the vibratory mill jar

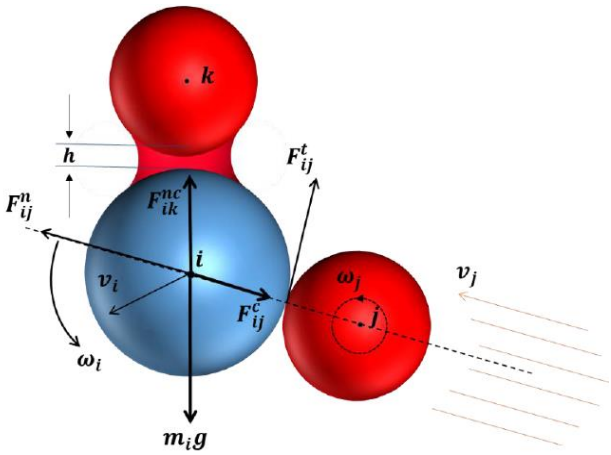


Figure 7: Schematic of forces applied to three arbitrarily interacting particles (reprinted from [14])

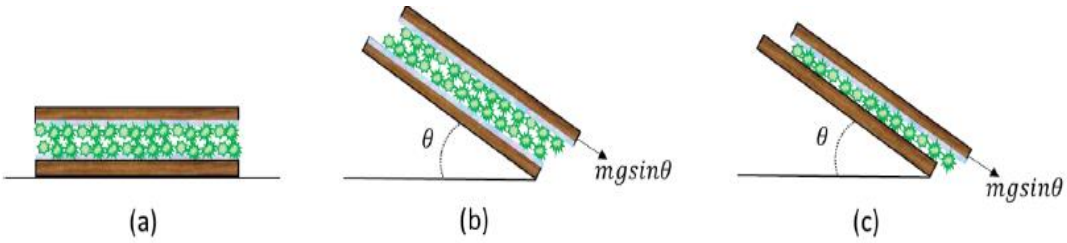


Figure 8: Schematic diagram representing the coefficient of sliding friction, with (a) is the surface at rest, (b) particle-particle sliding friction and (c) particle-wall sliding friction (reprinted from [14])

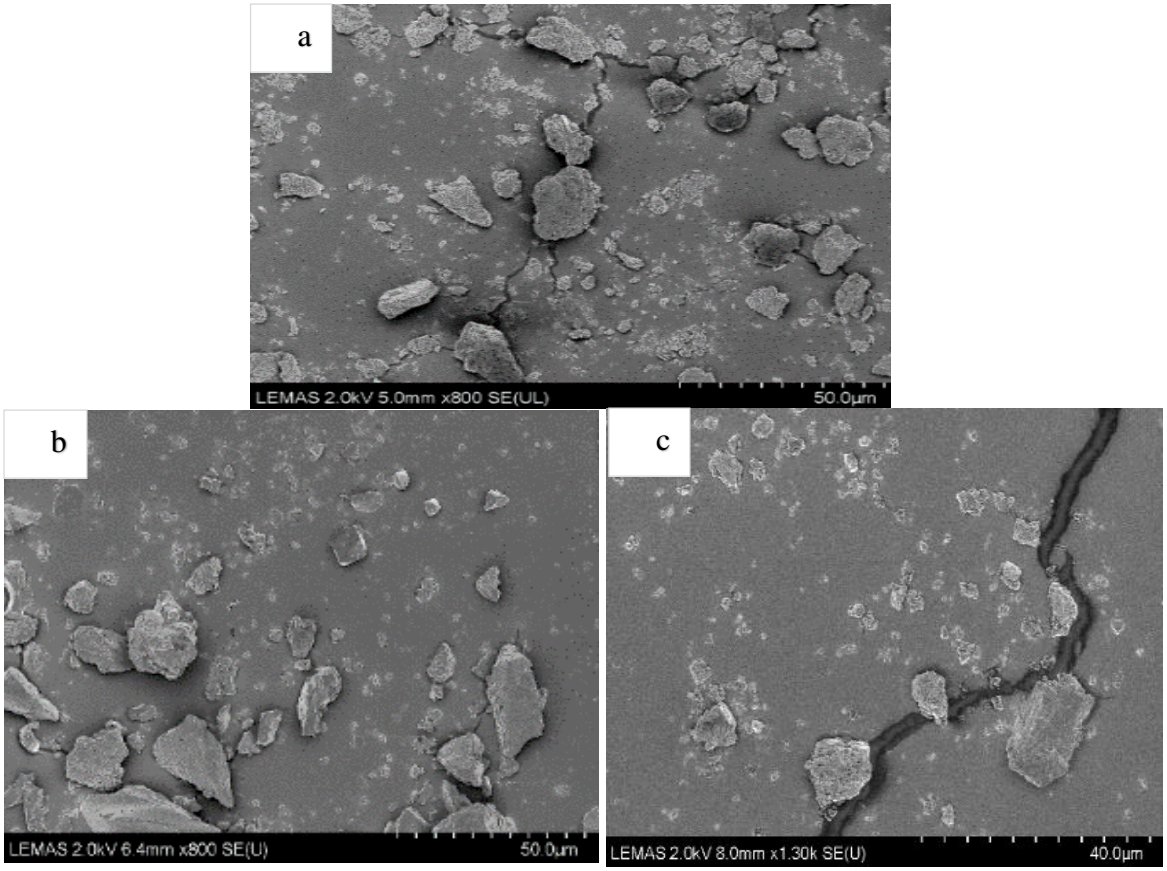


Figure 9: SEM images show the Morphology of DABOMD, a-Non-milled (×800), b- 300 min planetary ball milled (×800), c-300 min single ball milled (×800).

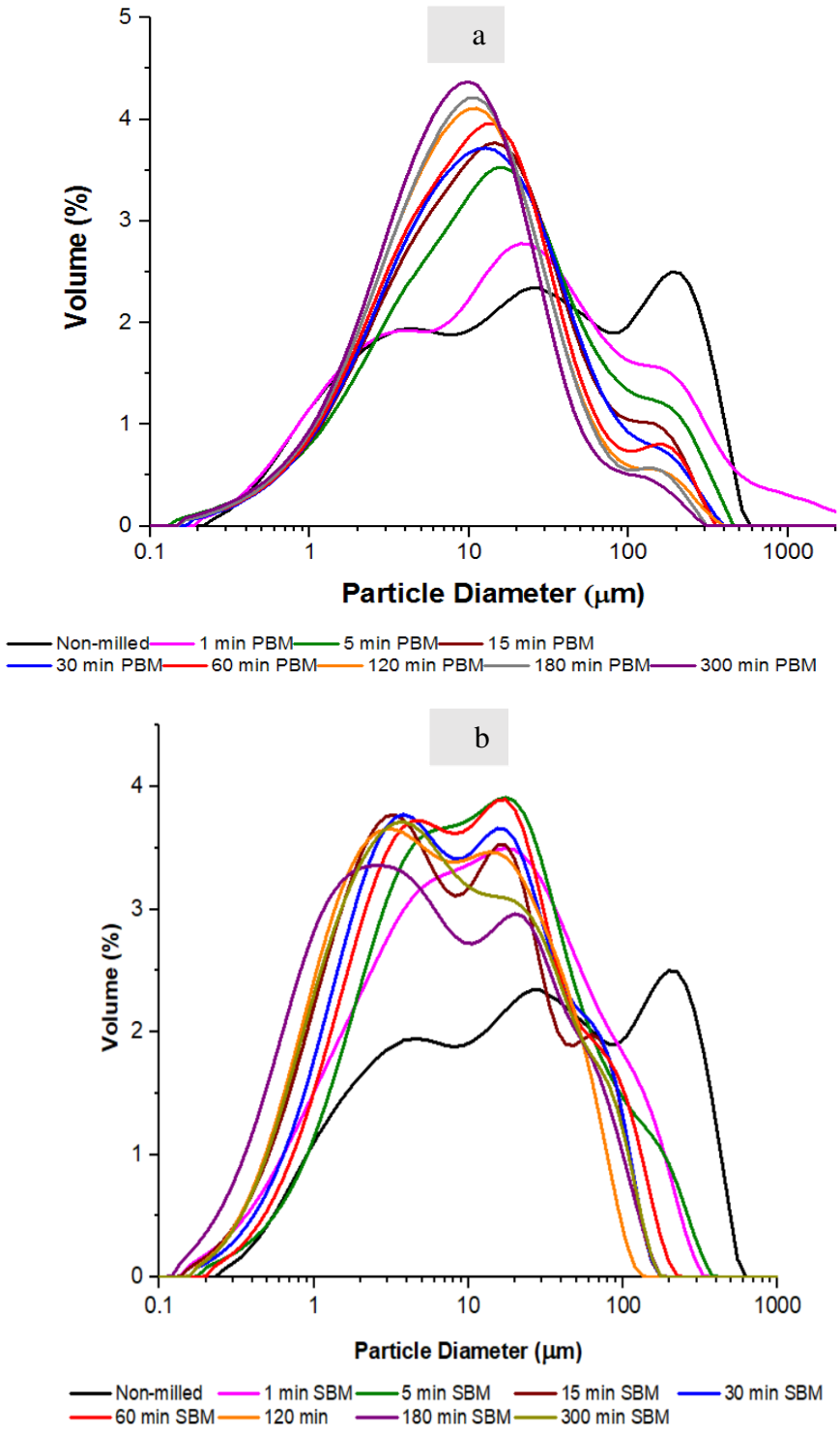


Figure 10: Particle Size Distribution of non-milled and milled DABOMD from 1min to 300 min. a) Planetary ball milled (PBM) ((Reproduced with the permission of American Chemical Society (ACS) **[1]** . b) Single ball milled (SBM)

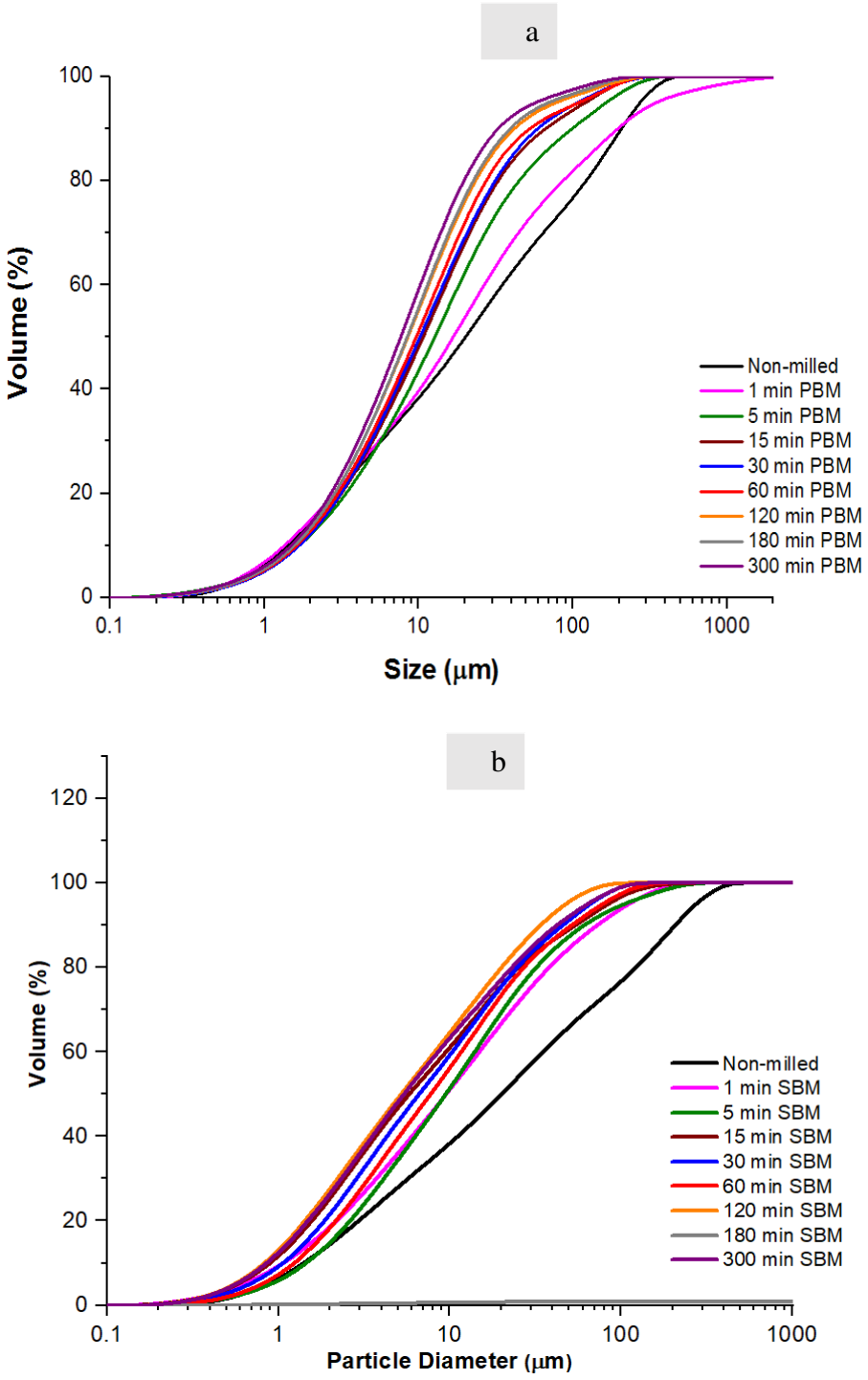


Figure 11: Cumulative Particle Size Distribution of non-milled milled DABOMD from 1min to 300 min. Planetary ball milled (PBM) ((Reproduced with the permission of American Chemical Society (ACS) [1]. b) Single ball milled (SBM)

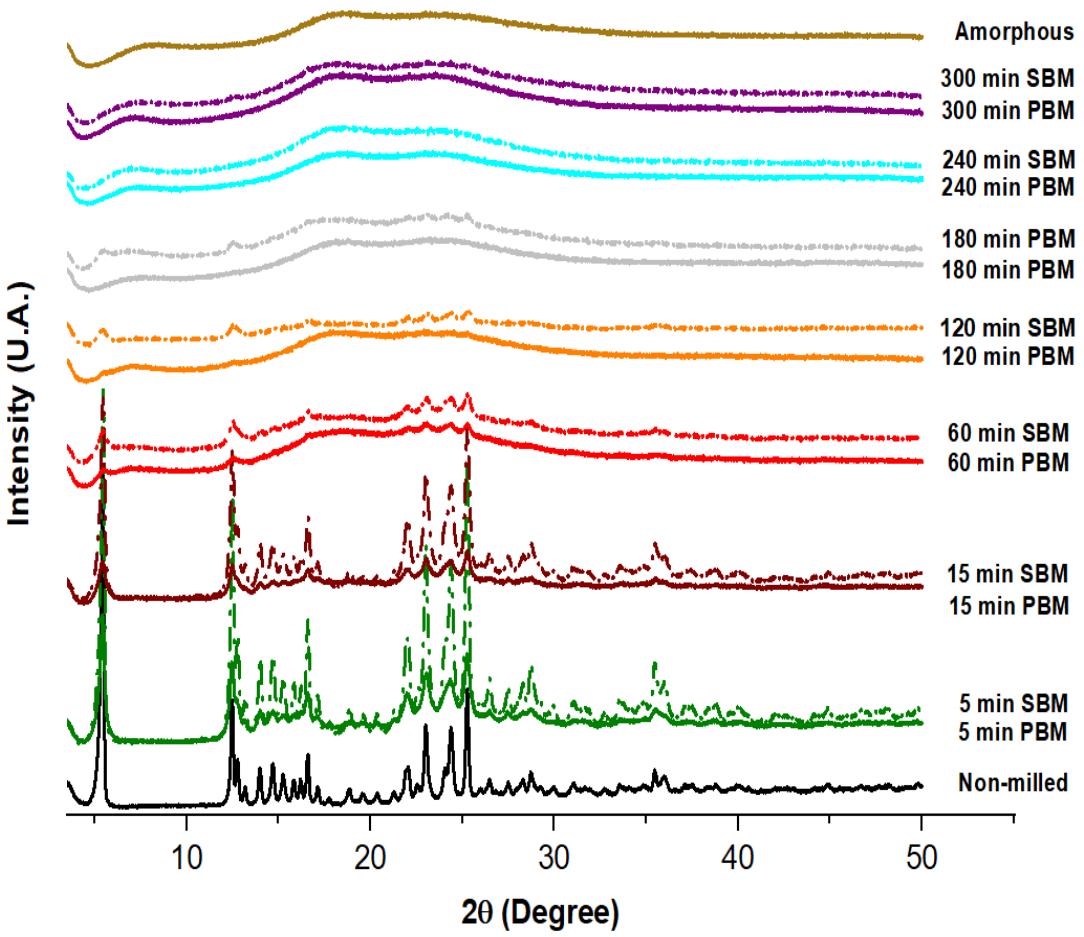


Figure 12: XRPD of DABOMD before milling and after milling from 1 min to 300min in Planetary ball milled (PBM) and in Single ball milled (SBM)

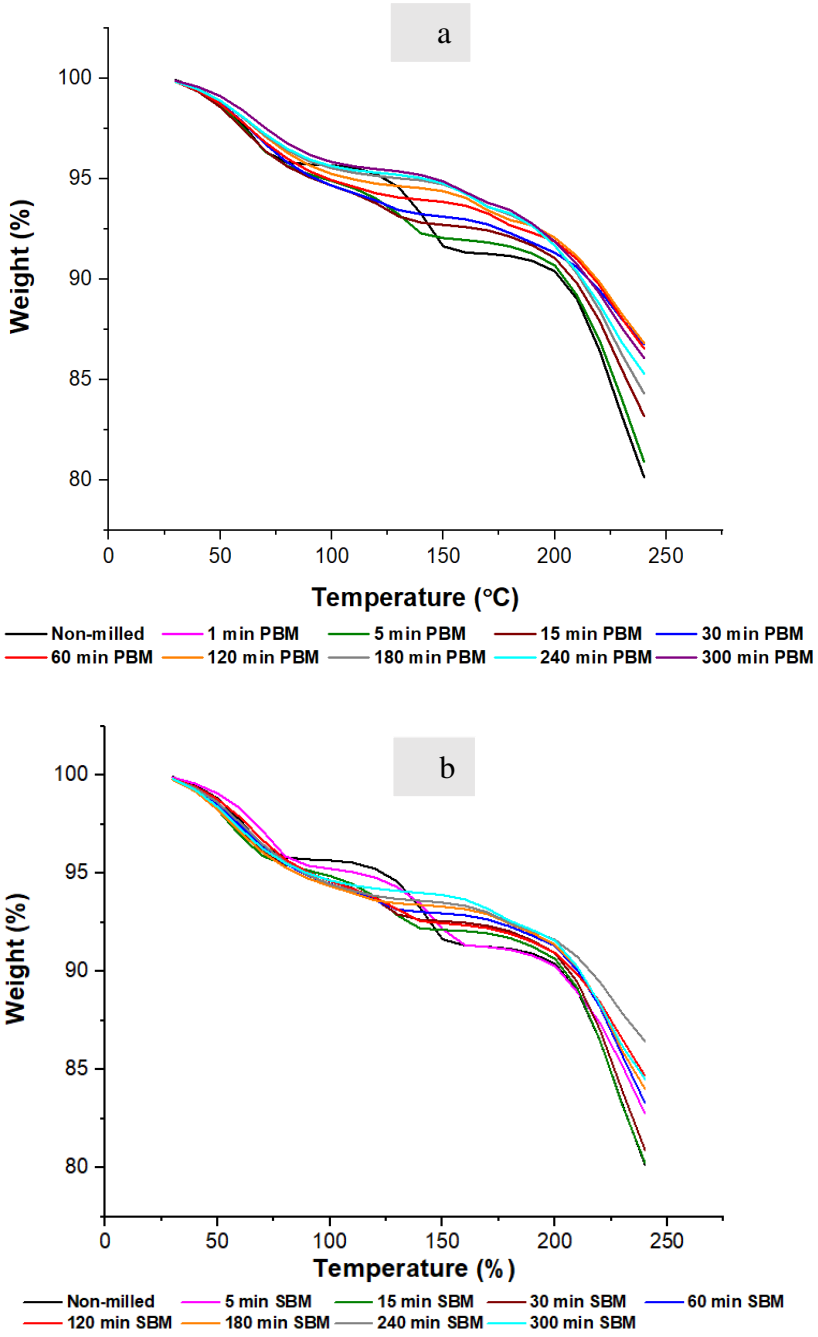


Figure 13: TGA Profile of the non-milled and milled DABOMD from 25 to 250 ℃ and a rate $5℃/min$. a) Planetary ball milled (PBM) ((Reproduced with the permission of American Chemical Society (ACS) [1] b) Single ball milled (SBM)

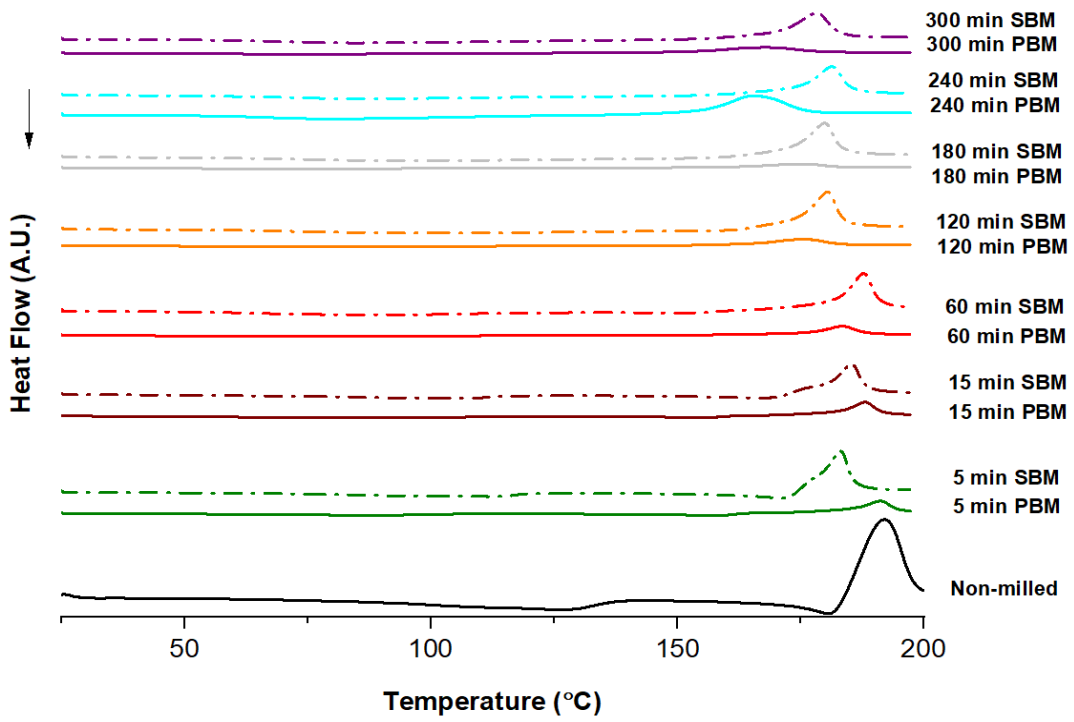


Figure 14: DSC Profile of DABOMD for the non-milled and milled DABOMD from 25 to 250 ℃ and a rate $\mathbf{5}℃/\boldsymbol{min}$ of Planetary ball milled (PBM) and Single ball milled (SBM)

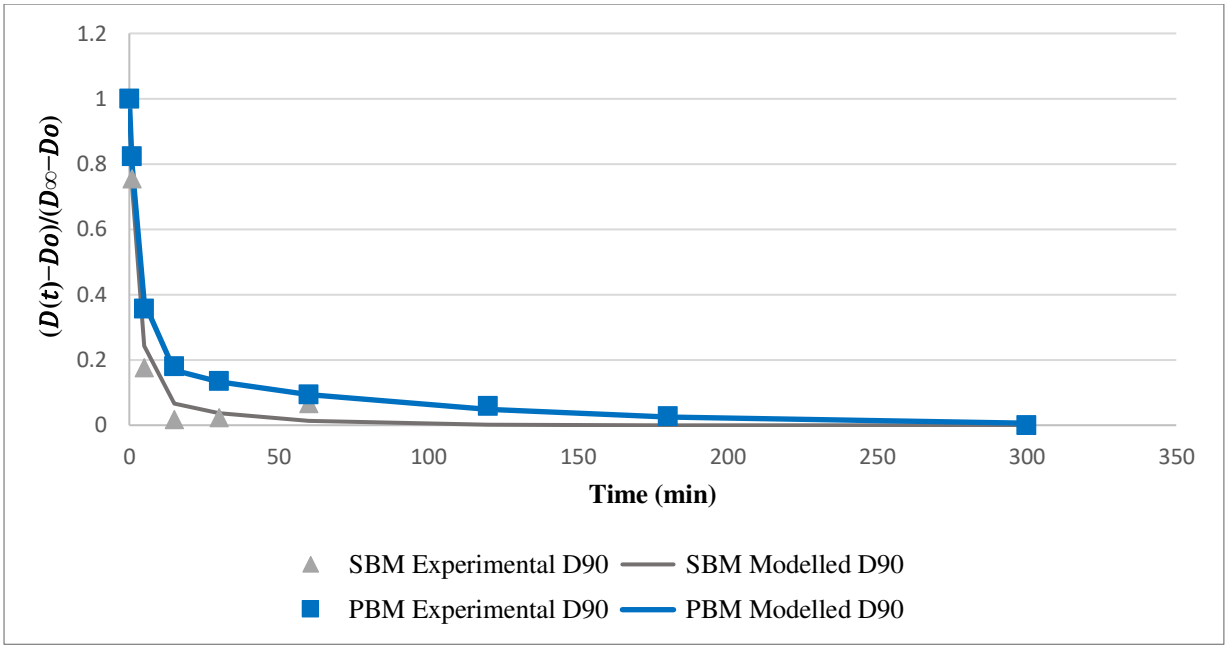


Figure 15: The kinetic of comminution of DABOMD represented by D_{90} for the Planetary ball milled (PBM) and Single ball milled (SBM) DABOMD

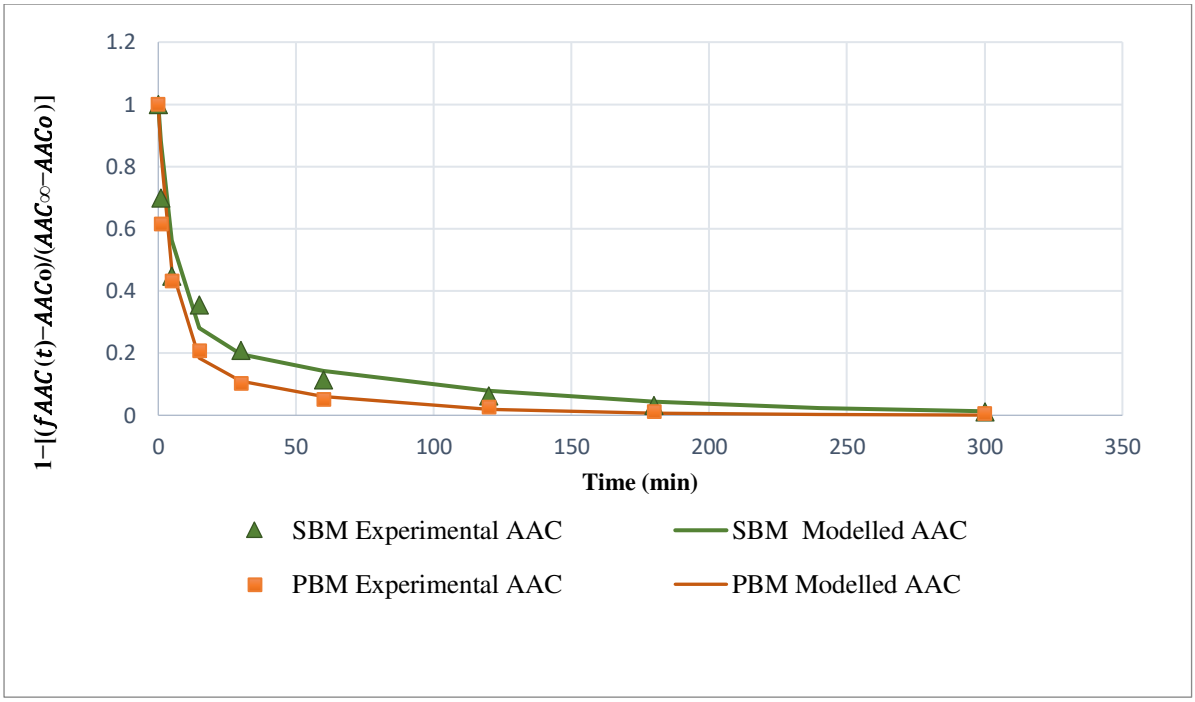


Figure 16: The kinetic of amorphisation of DABOMD derived from XRPD analysis of Planetary ball milled (PBM) and Single ball milled (SBM) DABOMD

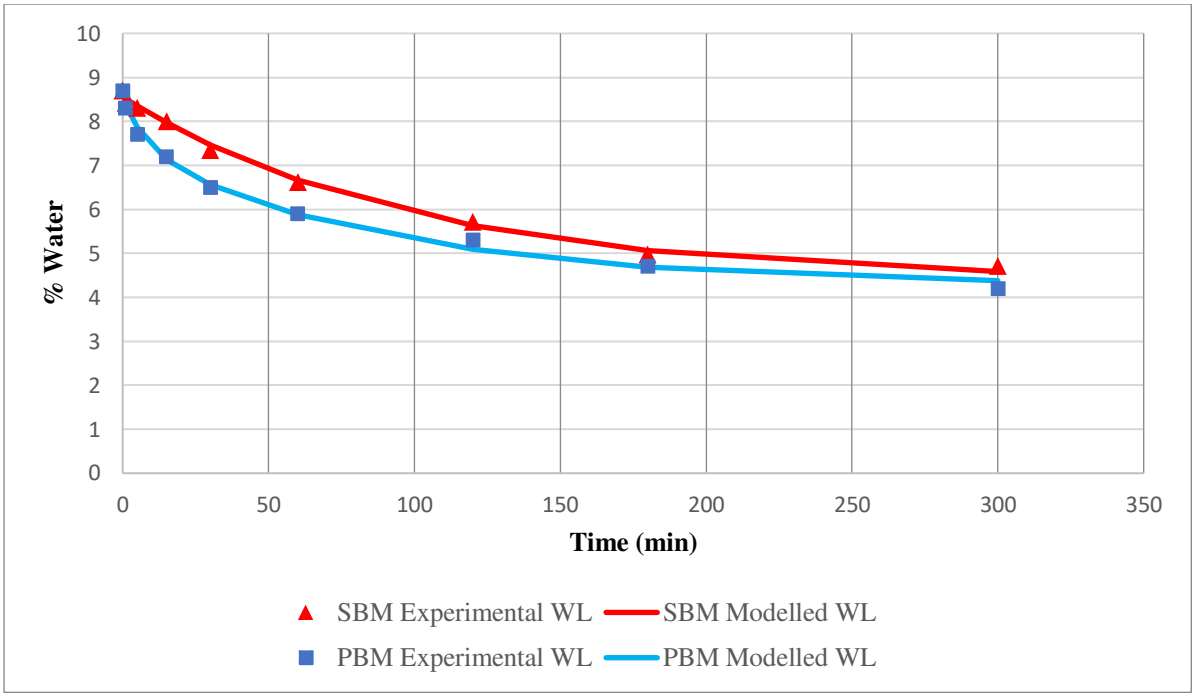


Figure 17: The kinetic water loss DABOMD in planetary ball mill and single ball mill

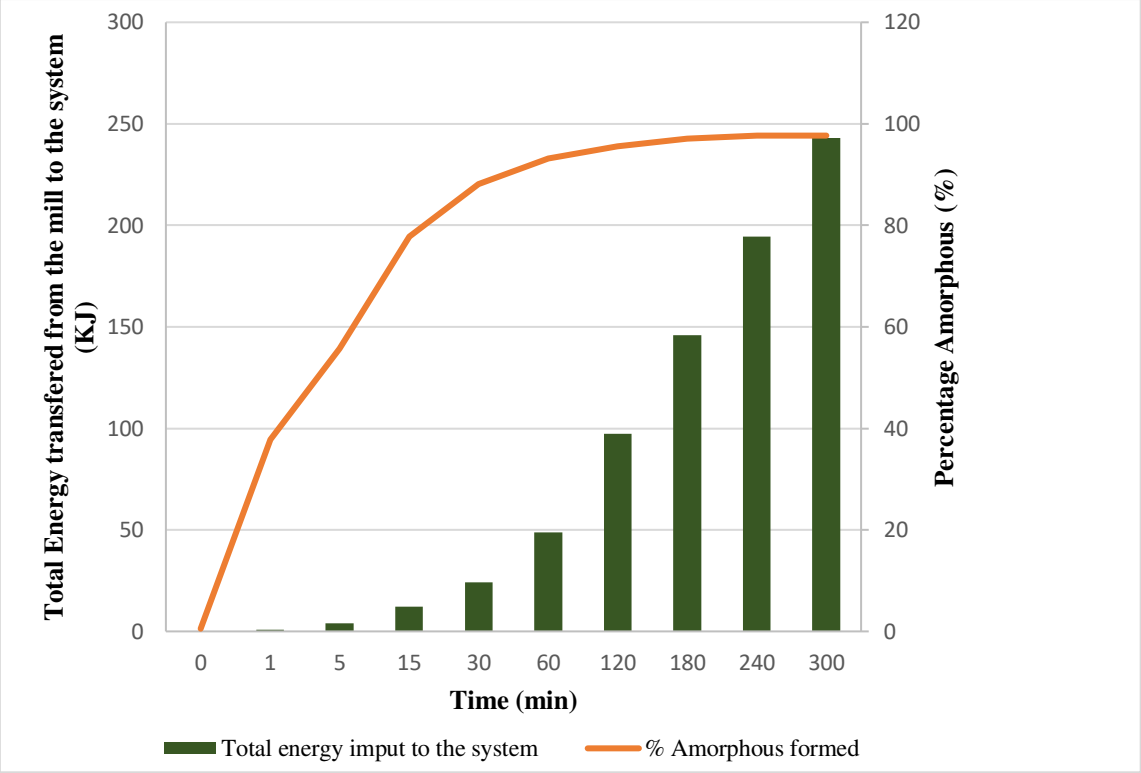


Figure 18: Total energy transferred to the system in a planetary ball mill and the amount of generated amorphous

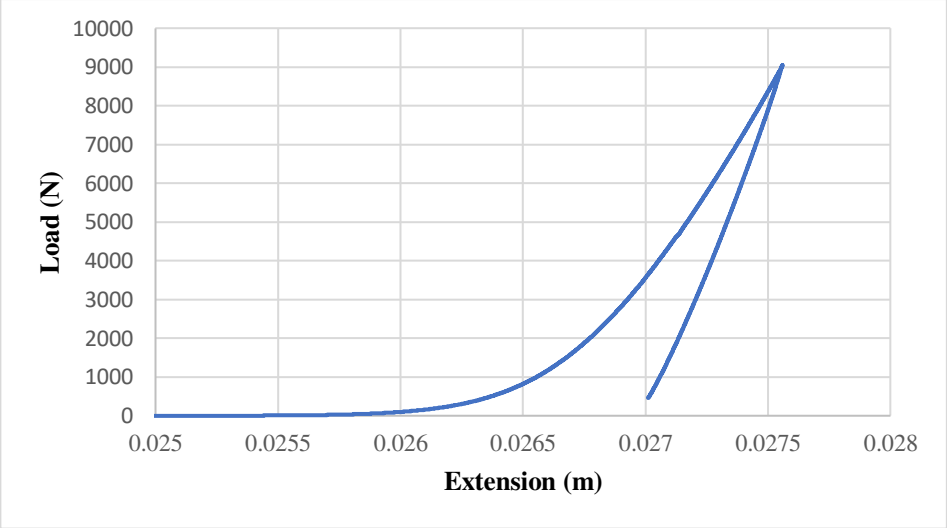


Figure 19: Deformation profile illustrating load versus extension graph for compression test

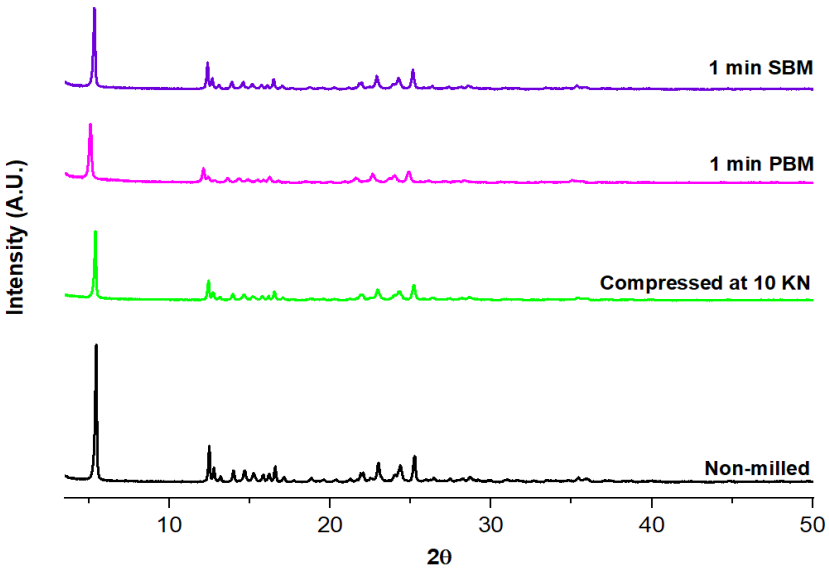


Figure 20: XRPD profile of DABOMD after compression

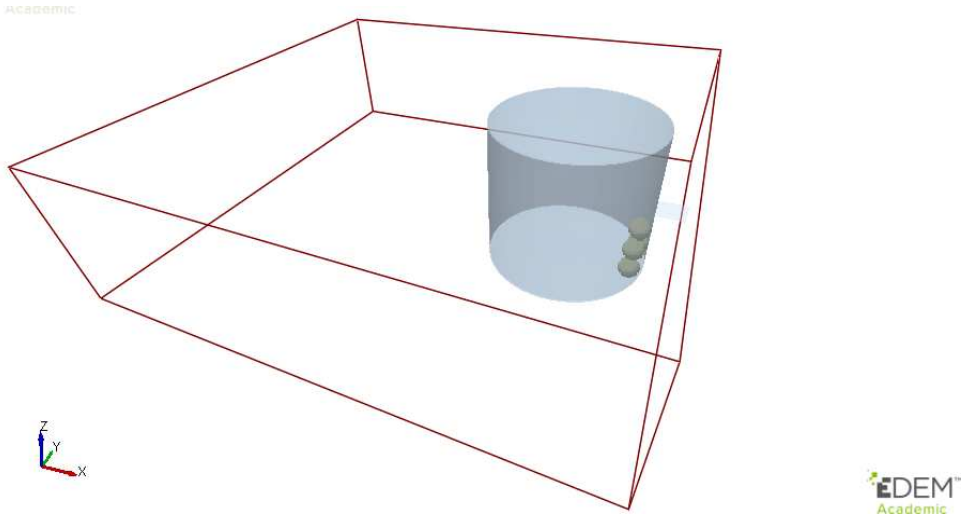


Figure 21: DEM Simulation of Planetary Ball Mill

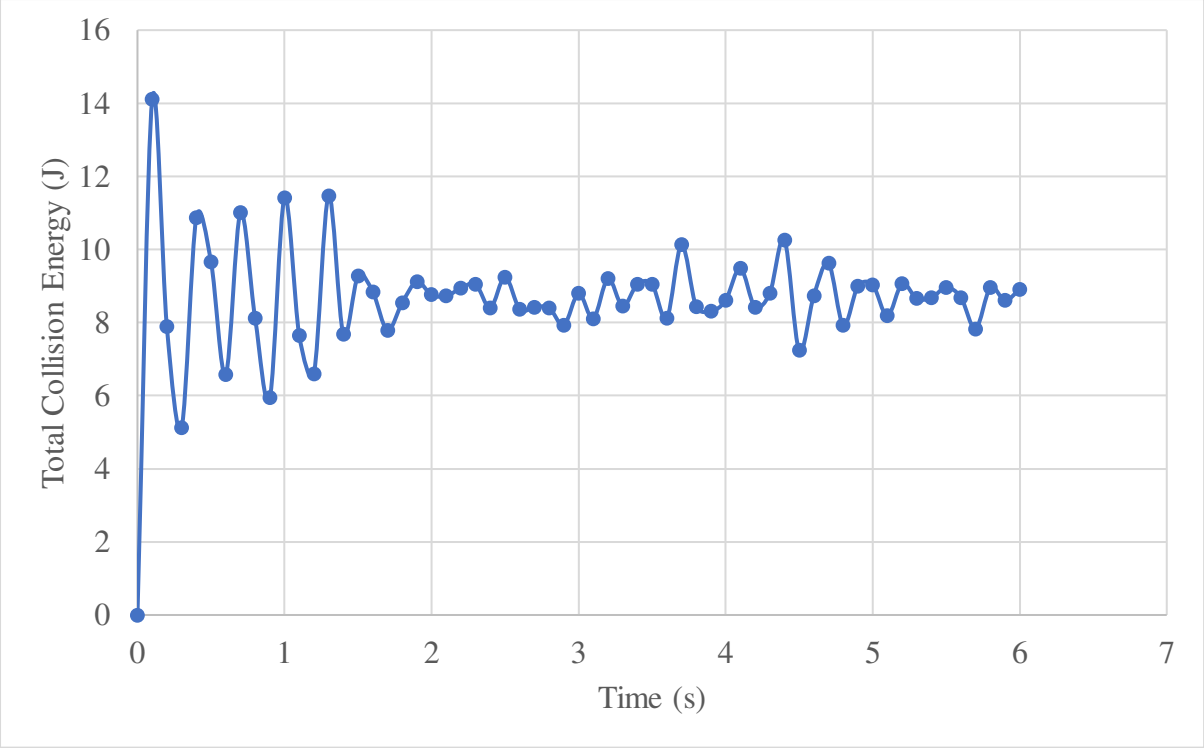
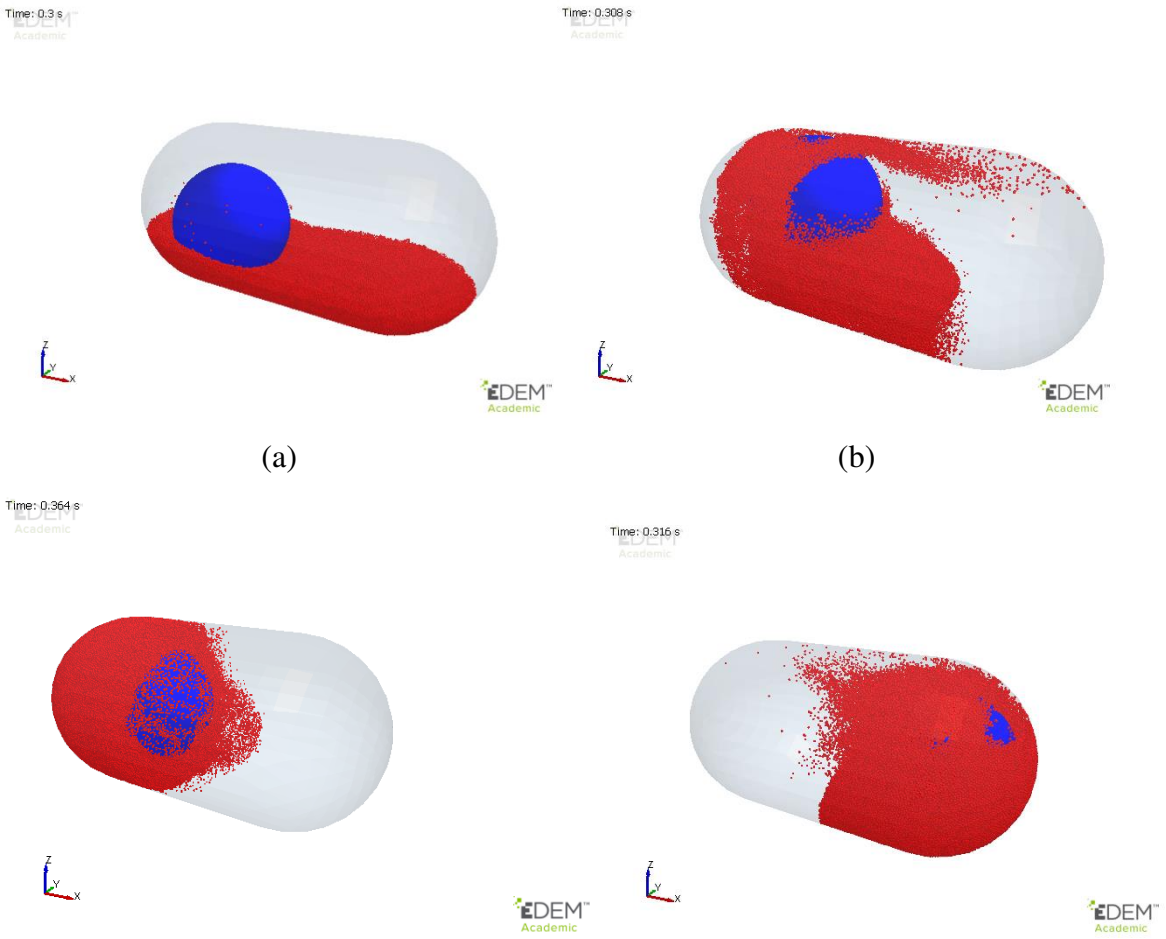


Figure 22: Total collision energy in planetary ball mill



(a) (b)

(c) (d)

Figure 23: DEM simulation of single ball mill at different times, (a) before vibration, (b) 0.008s, (c) 0.064 and (d) 0.16s

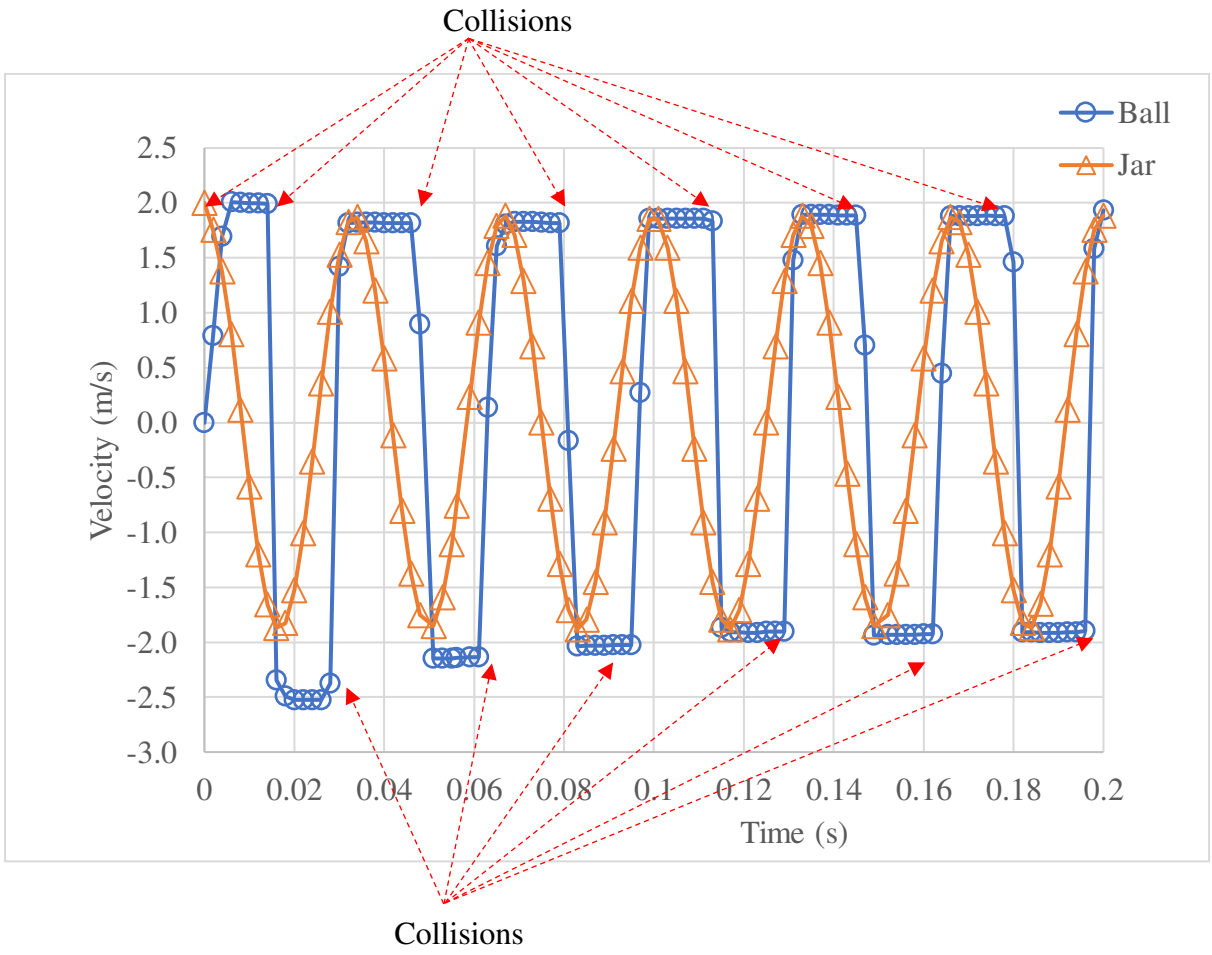


Figure 24: Velocities of jar and ball in SBM from DEM simulation

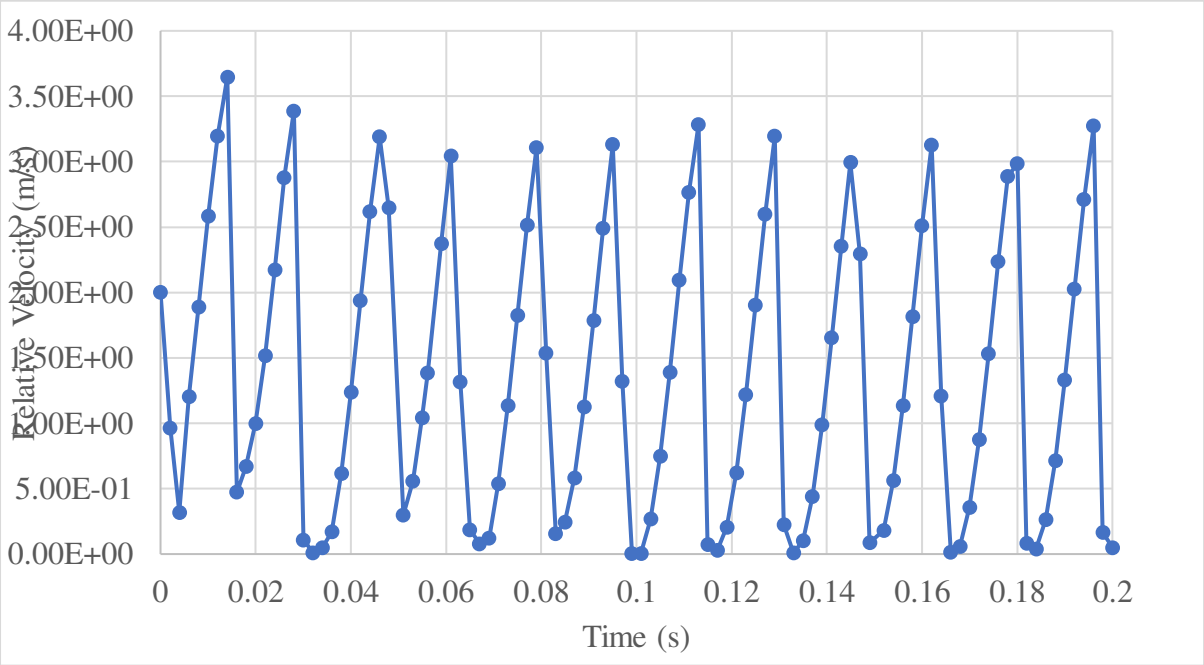


Figure 255: Relative velocities of ball and jar

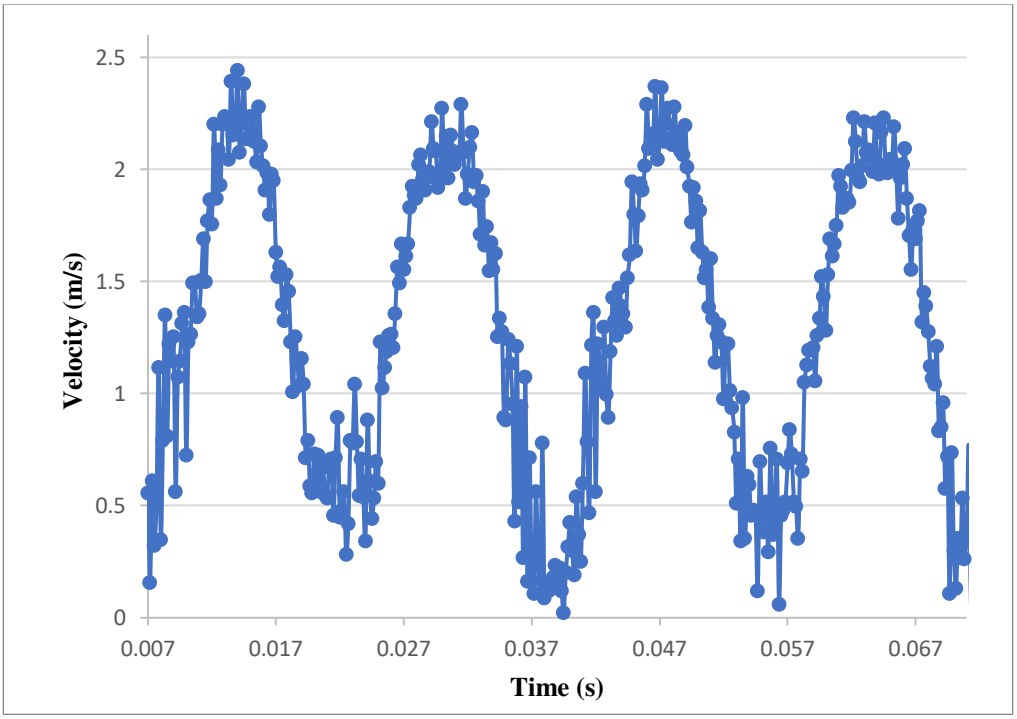


Figure 26: Velocity profile of the jar from high speed camera recording in SBM

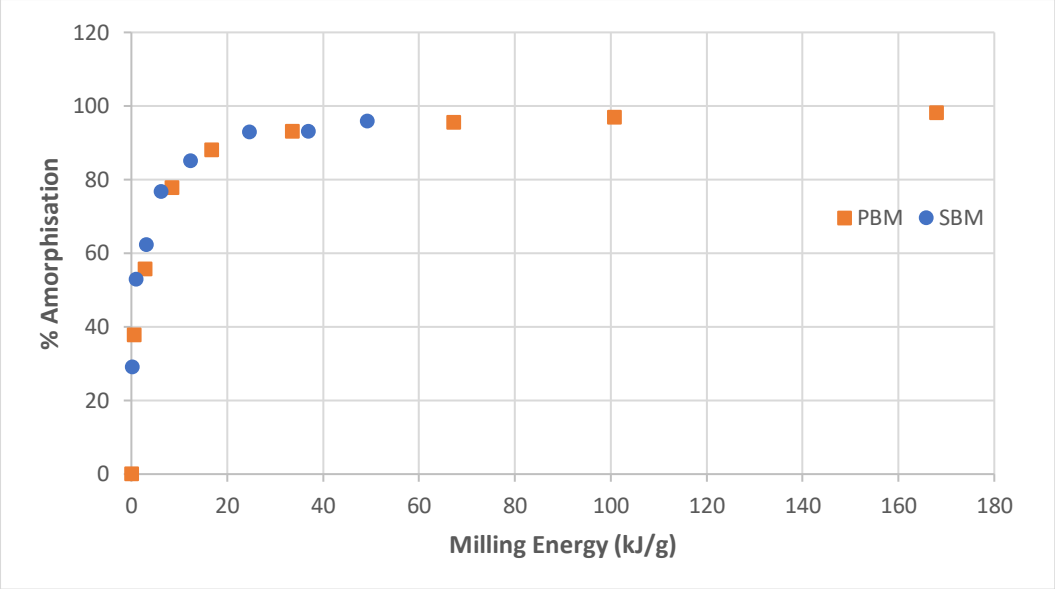


Figure 27: Correlation between amorphisation of DABOMD and energy level in different mills