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02 May 2026

~~EFFECT OF GO NANOSHEETS ON FRACTURE TOUGHNESS OF CEMENT COMPOSITES~~

EFFECT OF GO NANOSHEETS ON MICROSTRUCTURE, MECHANICAL

AND FRACTURE PROPERTIES OF CEMENT COMPOSITES

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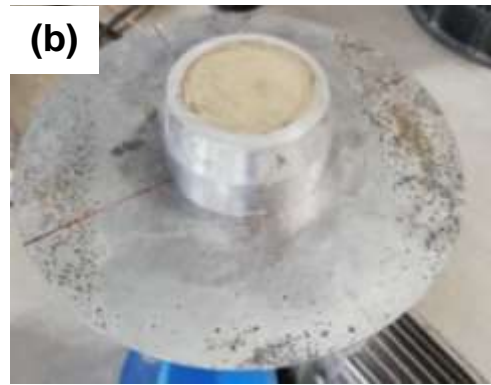
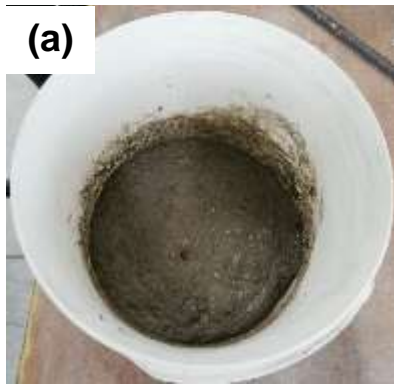
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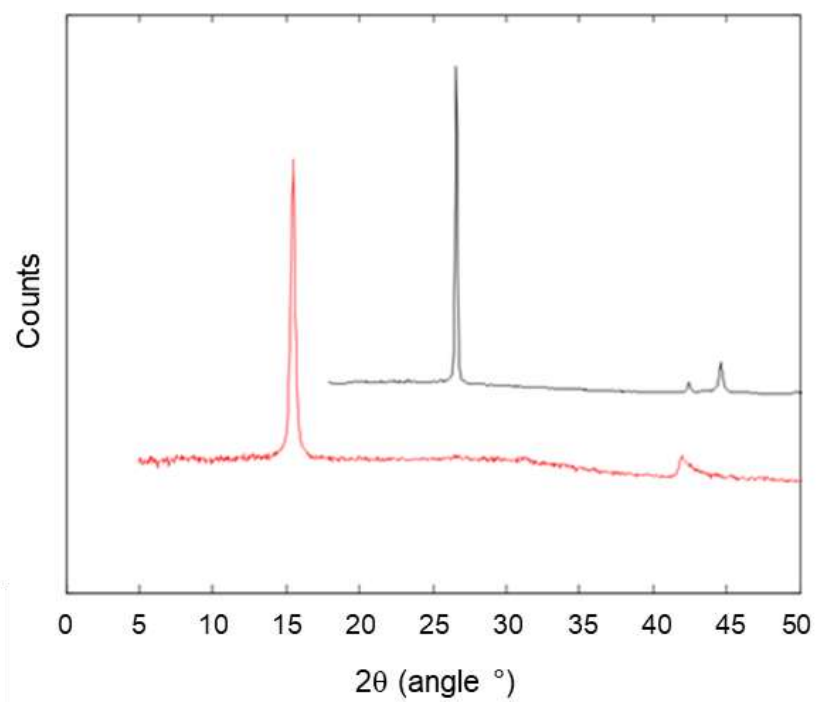
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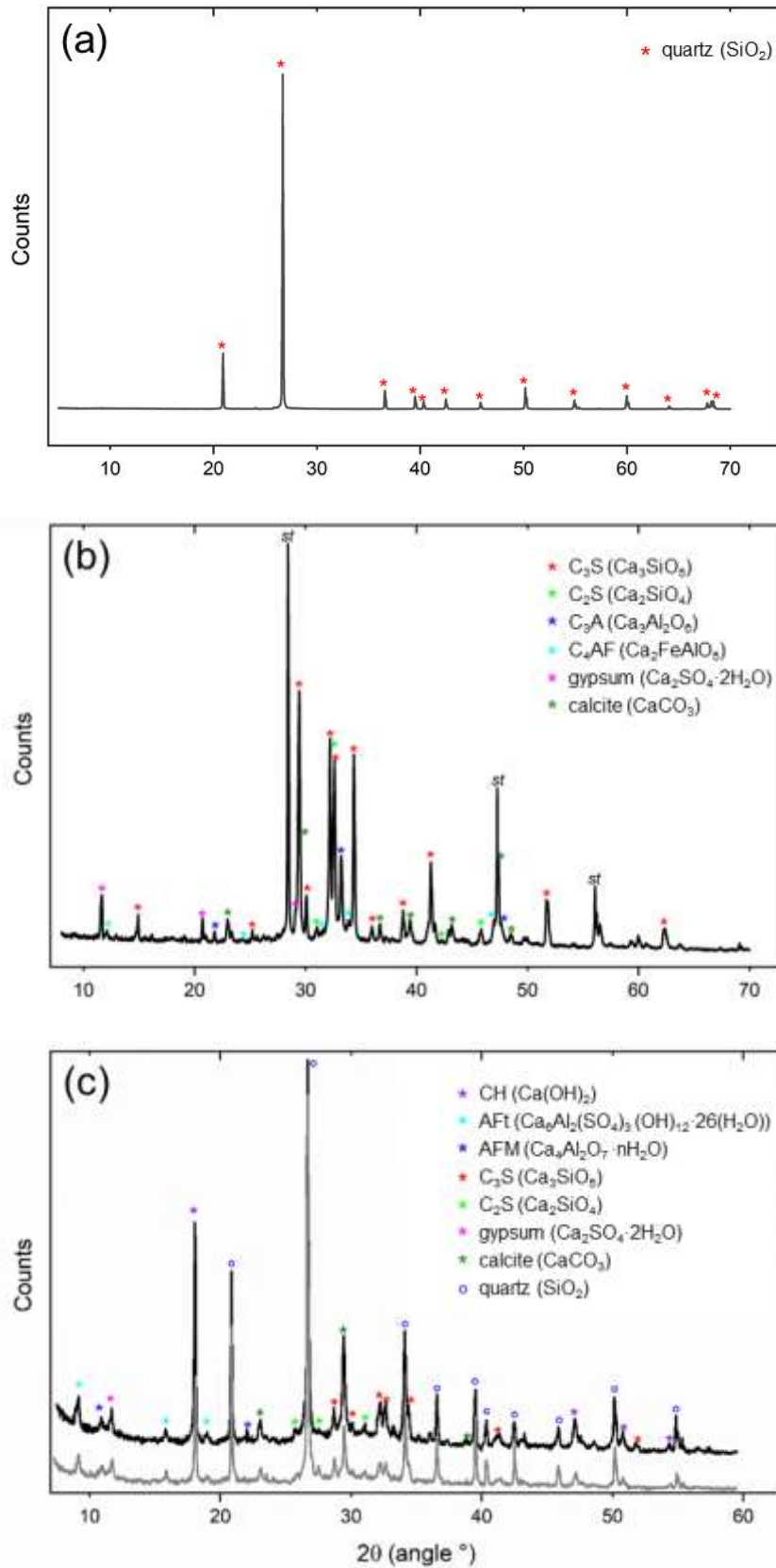
**FIGURES AND TABLES**



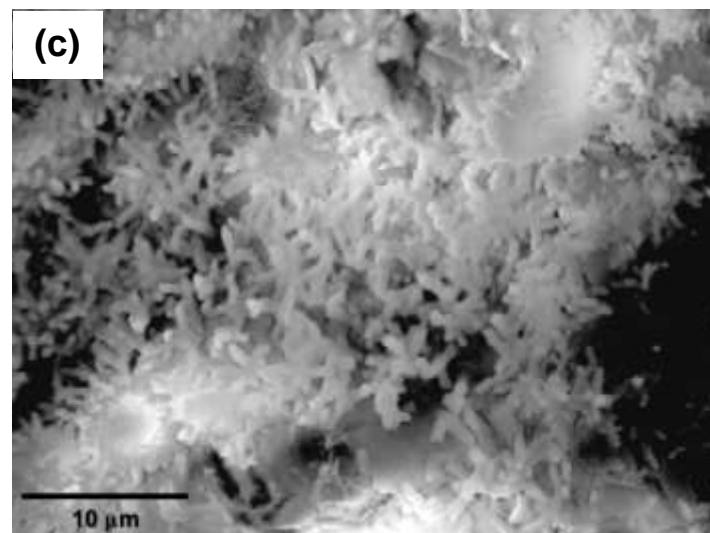
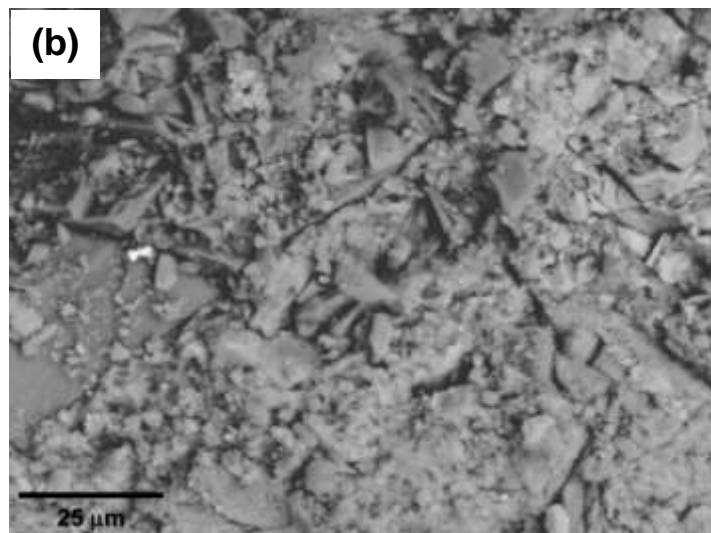
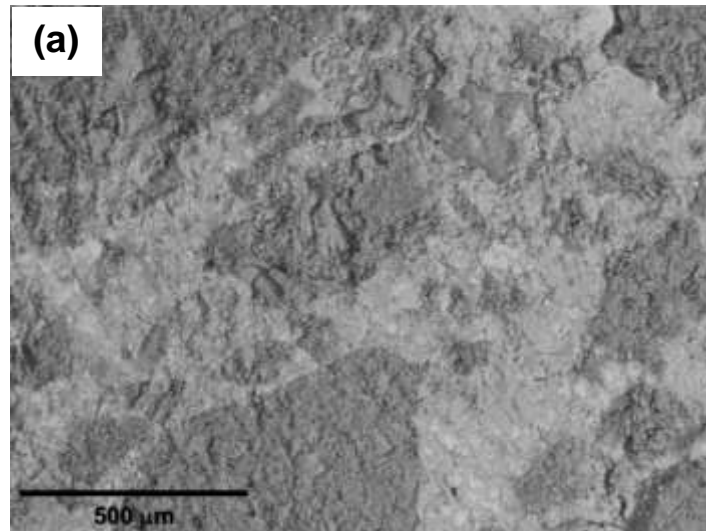
**Figure 1.** Preparation of GO-B specimens: (a) fresh slurry, (b) flow table test, (c) fresh slurry compacted in prismatic moulds.



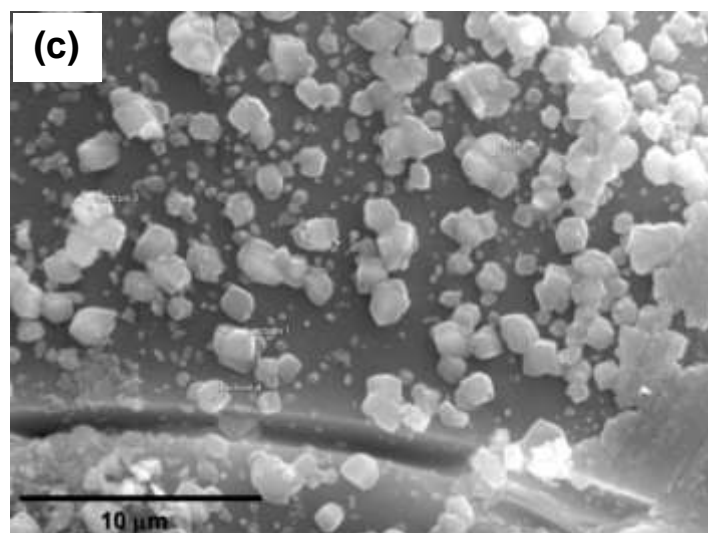
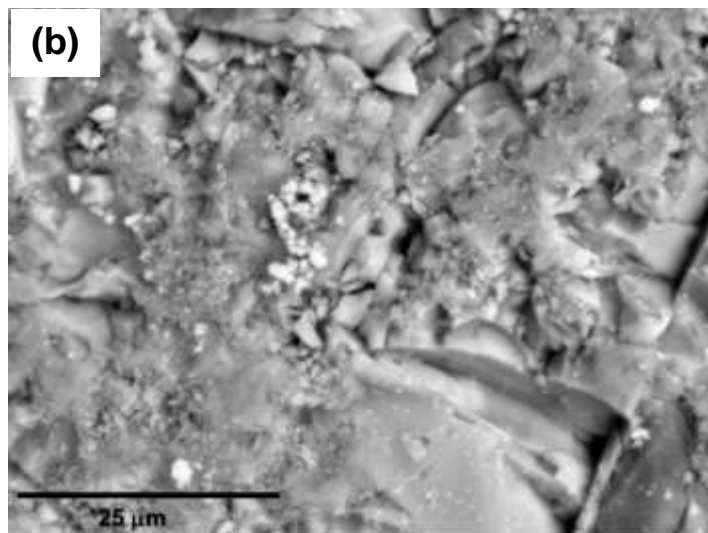
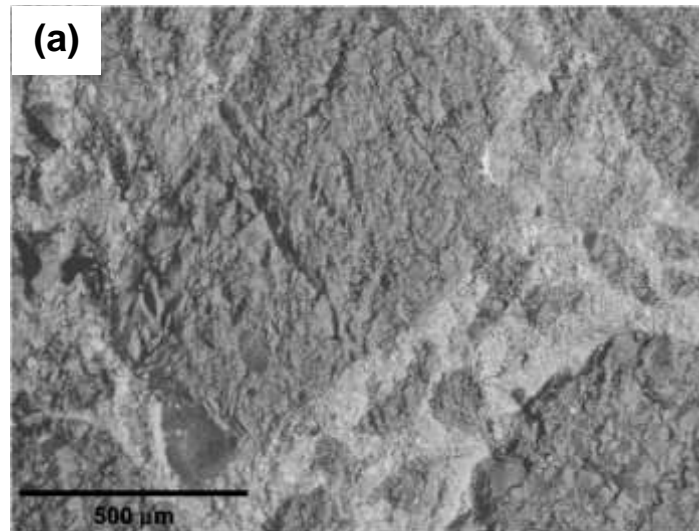
**Figure 2.** XRD spectra of pure graphite (black line) and GO (red line).



**Figure 3.** X-ray diffraction patterns of: (a) aggregates, (b) cement, (c) PM (black line) and GO-B specimens (grey line).



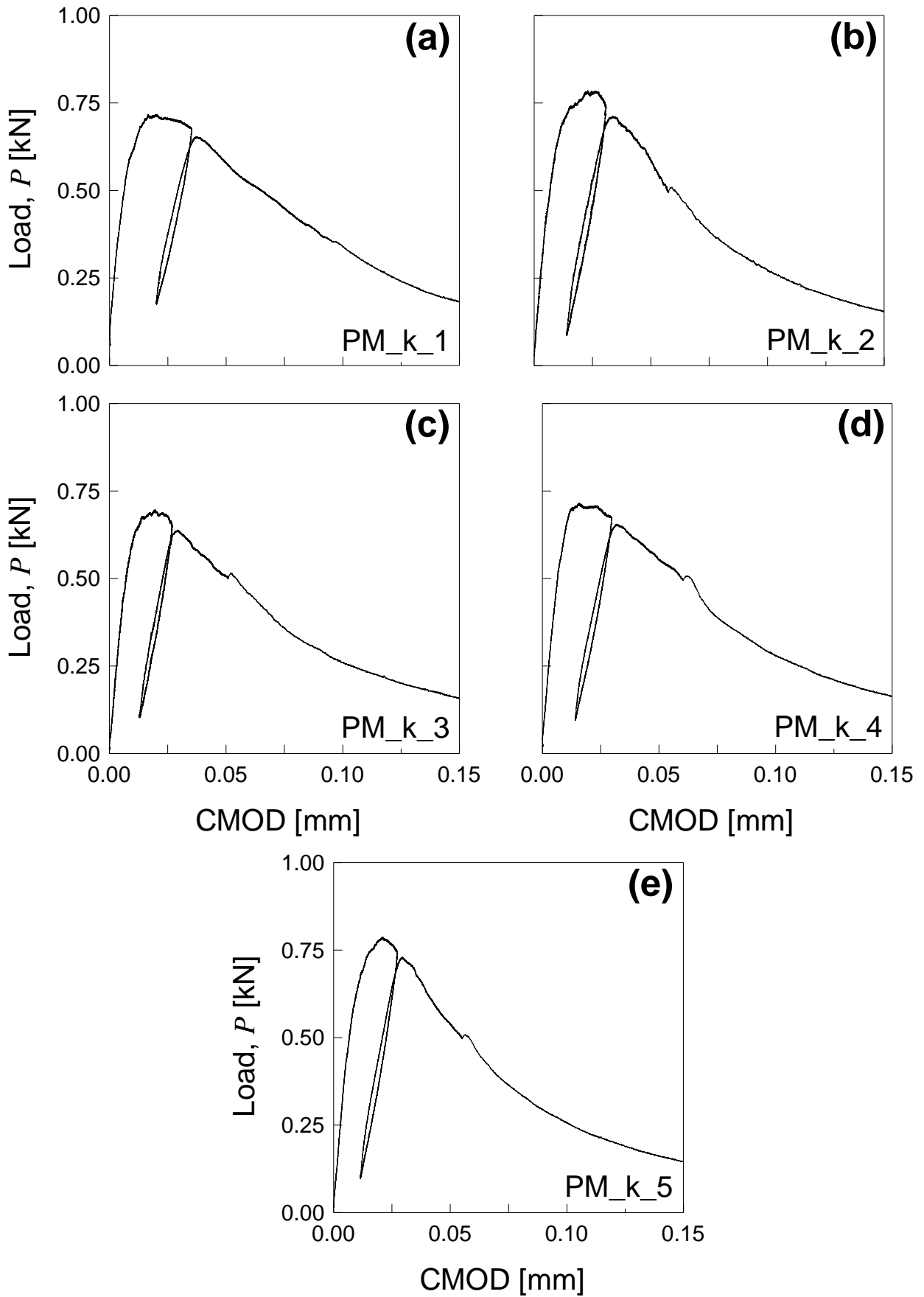
**Figure 4.** SEM images (in BSE) of PM specimen at different levels of magnification: (a) 55X, (b) 800X and (c) 1000X.



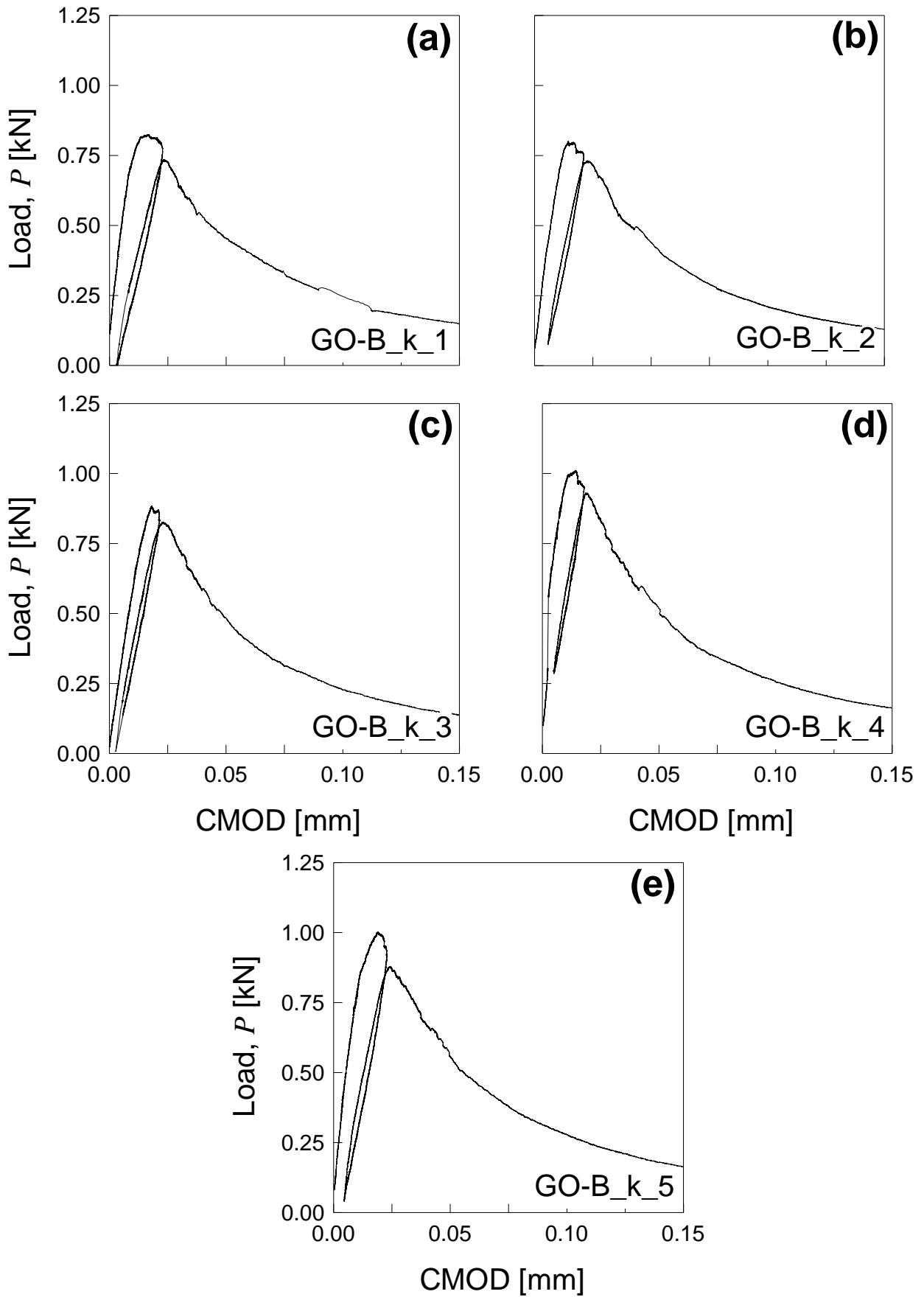
**Figure 5.** SEM images (in BSE) of GO-B specimen at different levels of magnification: (a) 55X, (b) 800X and (c) 1000X.

**Table 1.** Flexural and compression test results for both PM and GO-B specimen type.

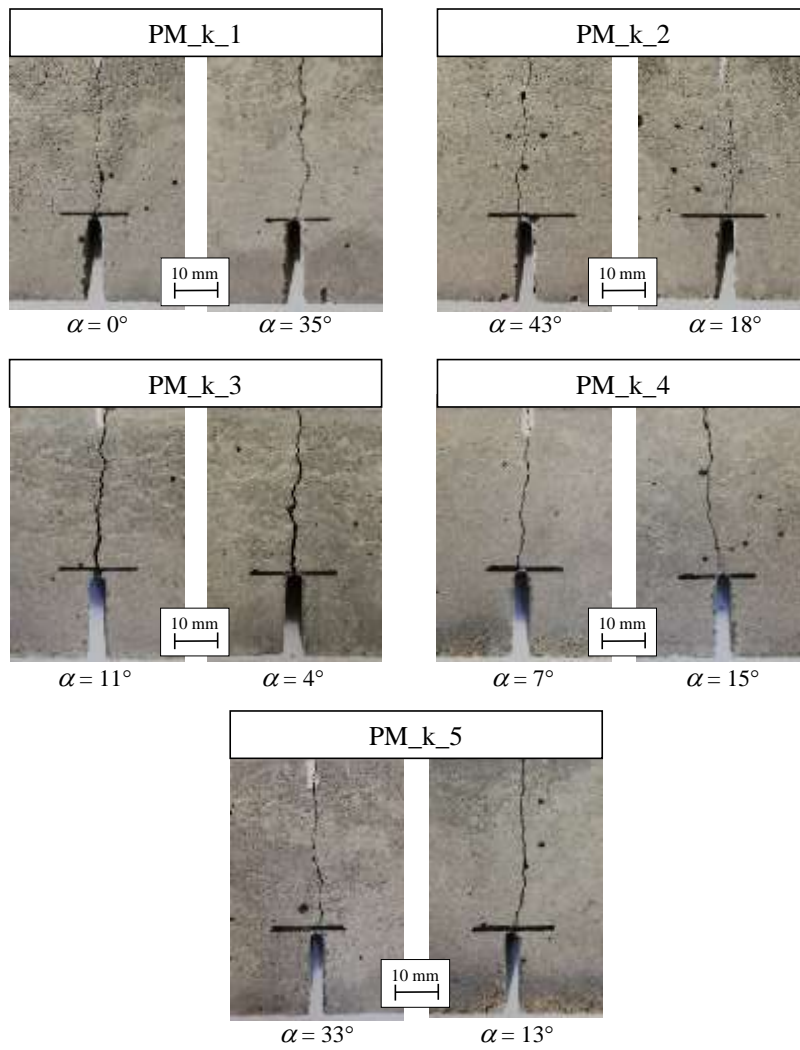
SPECIMEN TYPE	$P_f$ [kN]		$R_f$ [MPa]		$P_c$ [kN]		$R_c$ [MPa]	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
PM	1.994	0.103	5.285	0.297	151.027	6.660	87.517	2.980
GO-B	1.993	0.108	5.516	0.213	155.915	7.410	90.567	3.496



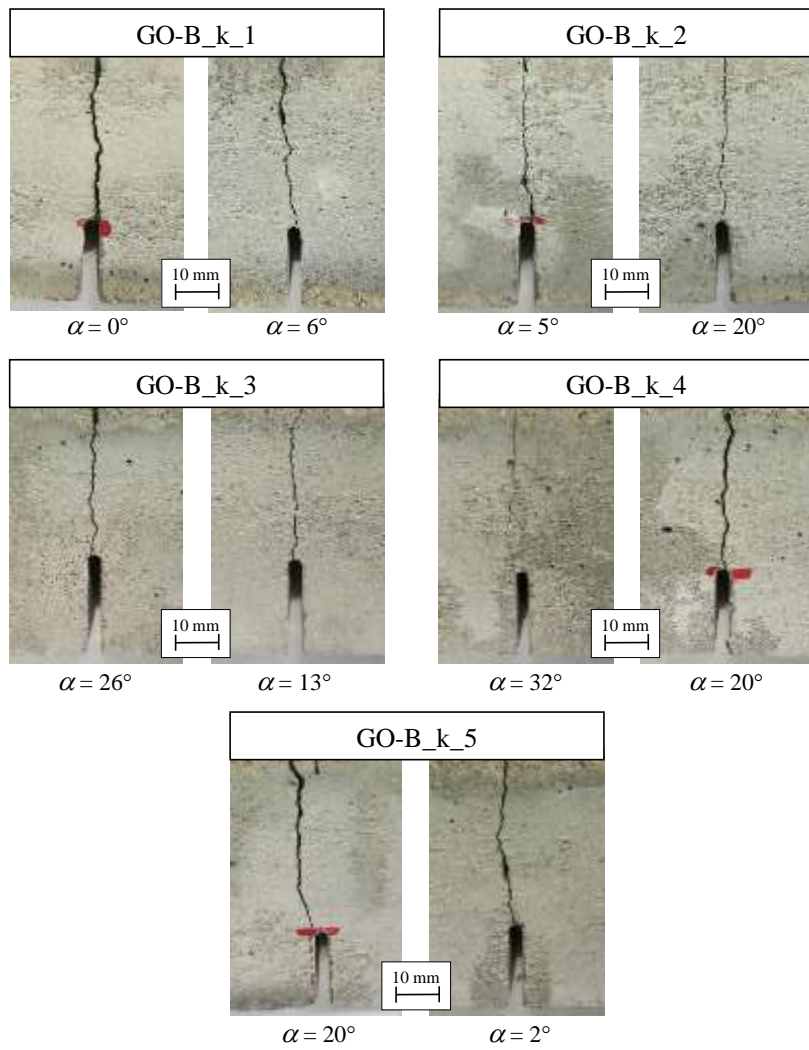
**Figure 6.** Load - Crack Mouth Opening Displacement (CMOD) curves for PM\_k specimens.



**Figure 7.** Load - Crack Mouth Opening Displacement (CMOD) curves for GO-B\_k specimens.



**Figure 8.** Crack paths and kinking angle values for PM\_k specimens.



**Figure 9.** Crack paths and kinking angle values for GO-B\_k specimens.

**Table 2.** Fracture test results for both PM and GO-B specimen type.

SPECIMEN TYPE	$P_{max}$ [kN]		$\alpha$ [°]		$E$ [GPa]		$K_{(I+II)C}^S$ [MPa·m <sup>0.5</sup> ]	
	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$	$\mu$	$\sigma$
PM	0.741	0.043	17.9	9.229	31.873	1.571	0.788	0.027
GO-B	0.916	0.086	14.4	8.742	33.529	1.529	0.992	0.072