

Pozzolanic activity of treated bauxite residue (BR) in mix with ordinary Portland cement

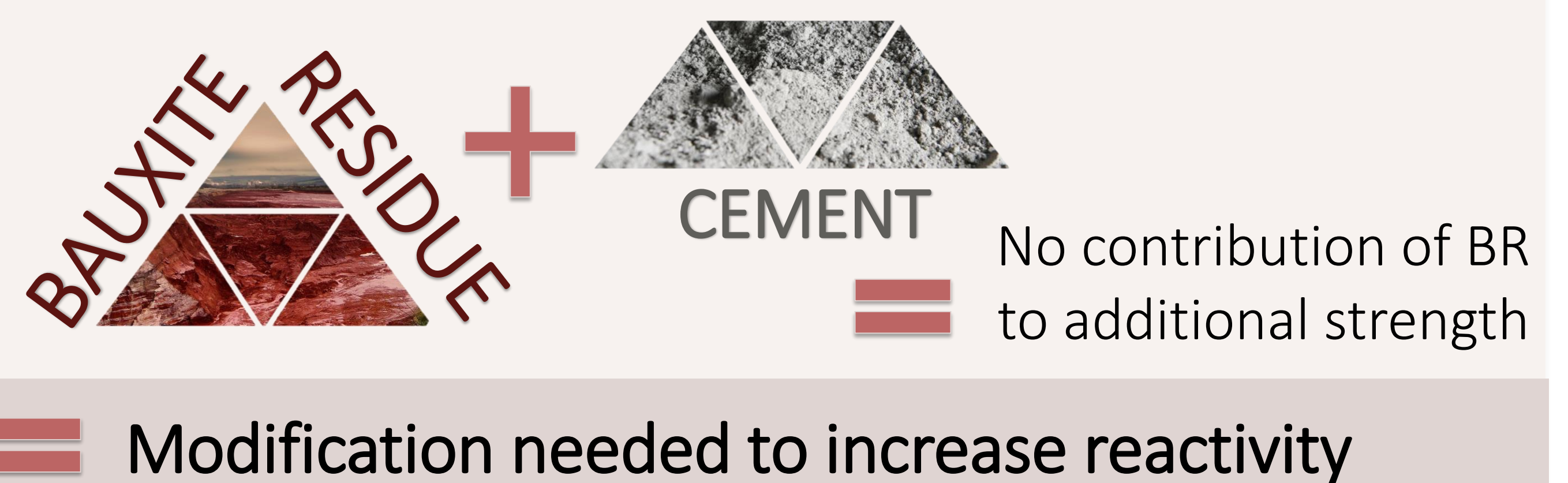
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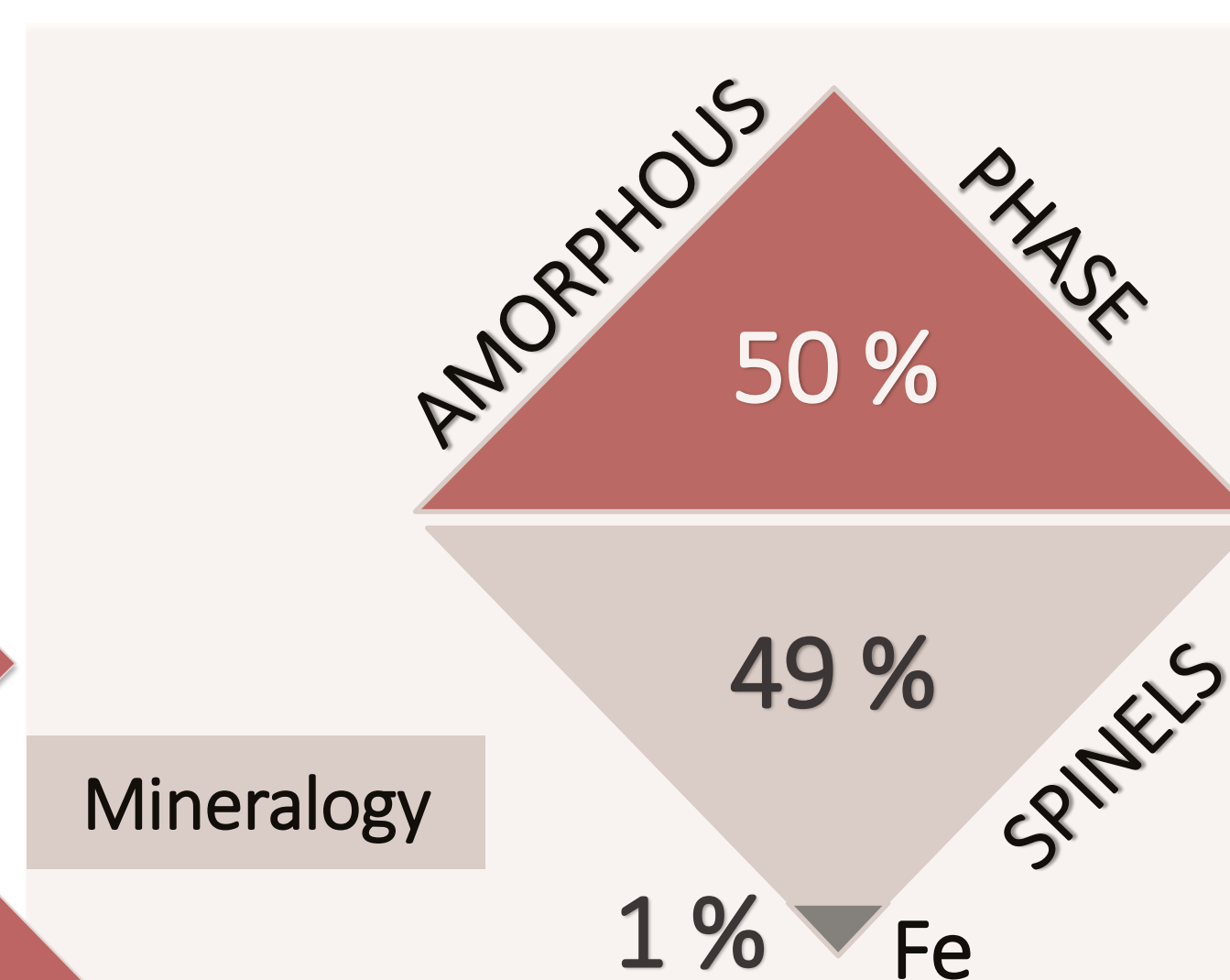
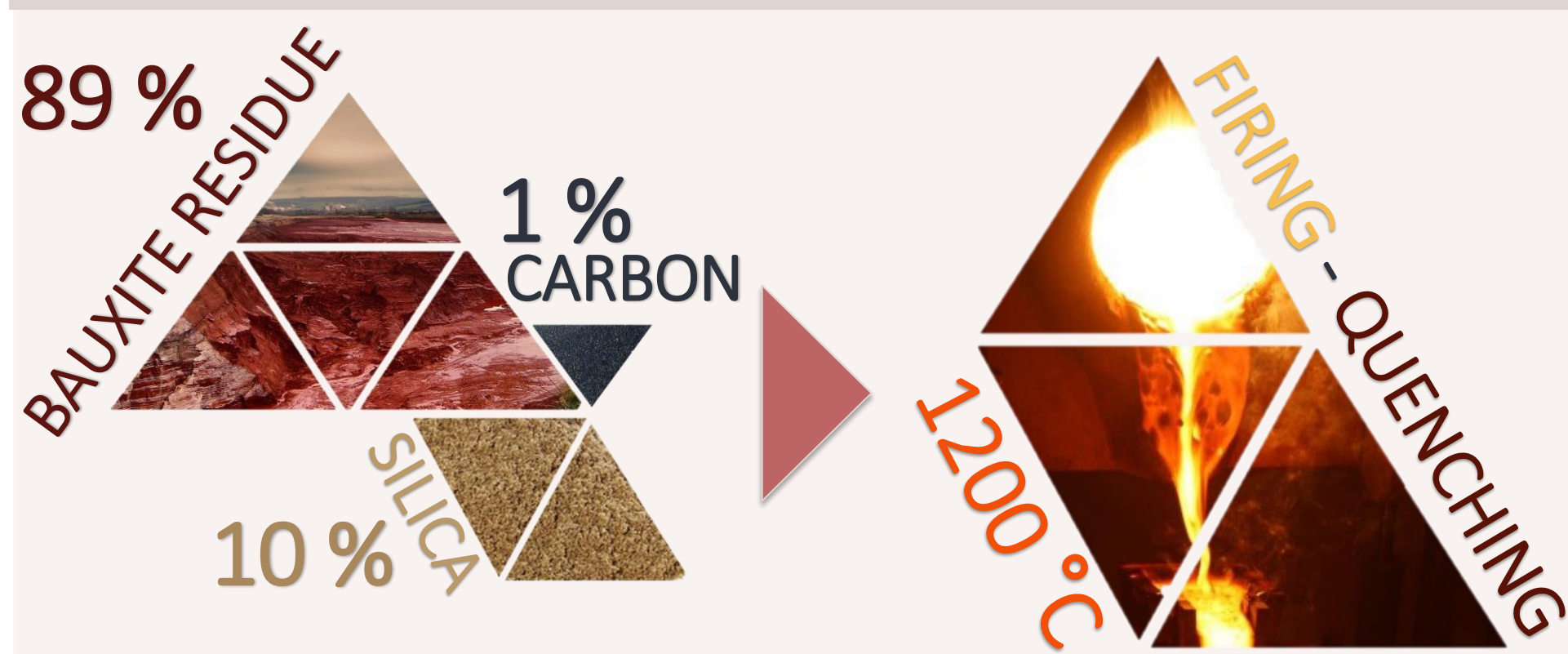
Motivation



Use of BR as alternative, cementitious material?

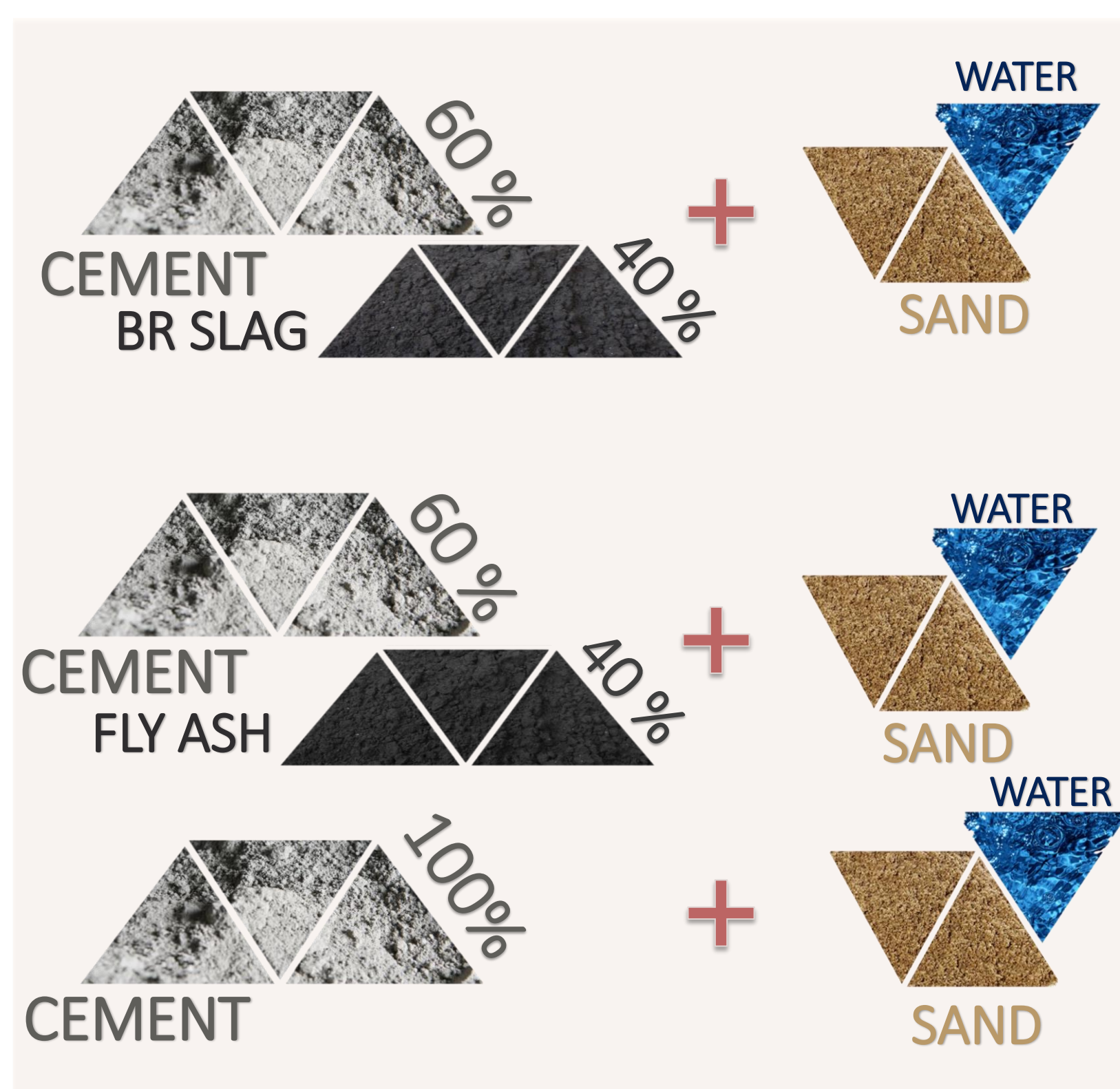


Modification of BR towards a potential pozzolanic material

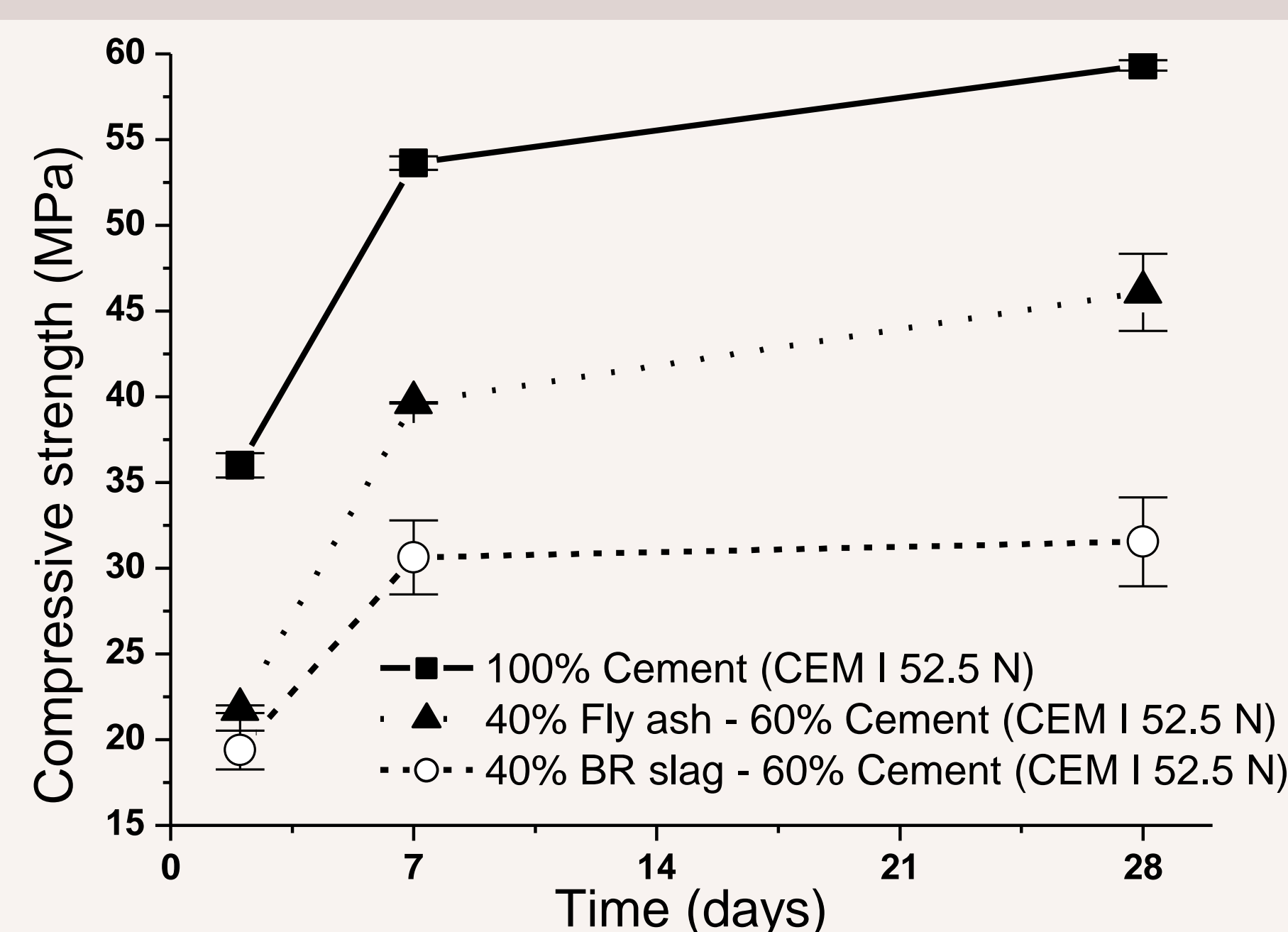


Amorphous phase is believed to be **reactive part** (pozzolanic) of modified slag which reacts with **cement hydration products** to further **strength-giving hydrates**

Mortar preparation including modified BR slag



Mechanical properties 2, 7 and 28 d



Fly ash acts as **pozzolanic material**
(78 % of the strength is reached compared to reference system)

BR slag shows **no pozzolanic activity after 28 d**
(drop of 45 % of the strength compared to reference system)

Outlook

Further investigations are needed with respect to **alternative modifications** and **firing conditions** (potentially the use of suitable fluxes) to obtain **more reactive amorphous fraction**. A critical evaluation of such a chemical and thermal modification of BR has to be carried out in order to assess the **environmental impact** as well as the **economic feasibility**.

Discussion

A possible explanation for the results described above, is that the **amount of amorphous phase** is, compared to fly ash, either **too low** or its **chemical composition is not suitable** to promote pozzolanic reactions with the formed portlandite. A **combination of both factors** is also conceivable.

Acknowledgements



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