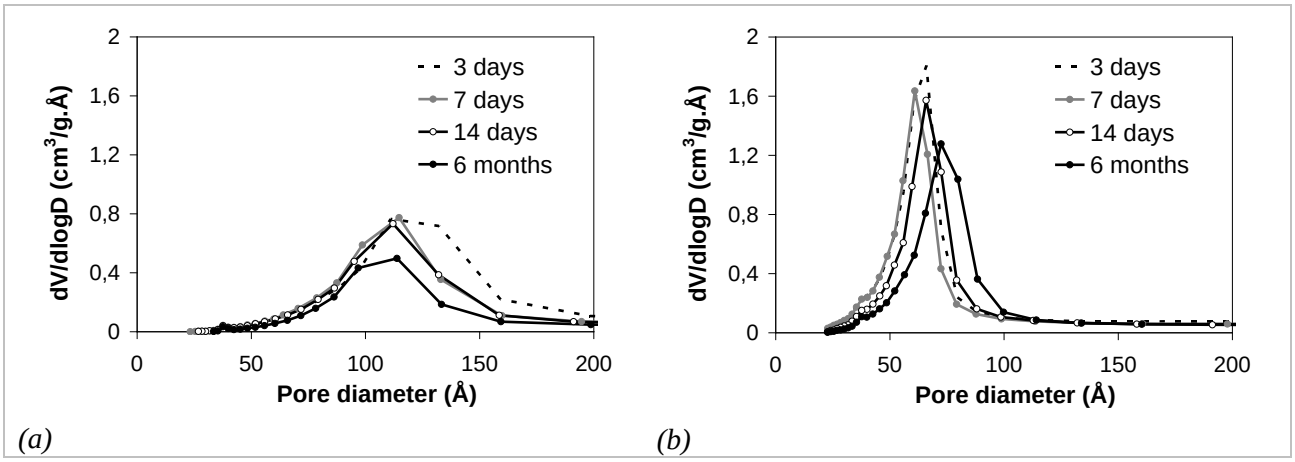
Supporting information

BJH for both geopolymers

Figure 1 BJH pore-size distribution for sodium-geopolymer *(a)* and potassium-geopolymer *(b)* at different aging times : t = 3, 7, 14 days and 6 months



Whatever the nature of the alkali cation used in the synthesis, between 3 days and 6 months, the pore volume decreases from 0.75 to 0.5 $cm^3.g^{-1}.Å^{-1}$ for sodium-geopolymer and from 1.80 to 1.25 $cm^3.g^{-1}.Å^{-1}$ for potassium-geopolymer. As far as the pore size distribution is concerned, aging yields to a slight increase in the mean pore diameter for potassium-geopolymer whereas it remains substantially constant for sodium geopolymer. Several things may explain this result:

- The mean pore diameter increases because the smallest pores disappear
- Over time, the size of the largest pore decreases and therefore they become detectable by gas adsorption

Calculation of the solid network density

$\rho_{solid\ network}$ was calculated by assuming that the solid network is a mix of metakaolin, silica from the activating solution and the alkali which maintain the electrical neutrality in the matrix

$$\Delta\rho^2 = (\rho_{solid\ network} - \rho_{pore\ fluid})^2 = [b_{th}(de_{solidnetwork} - de_{pore\ fluid})]^2 \qquad (1)$$

where $de_{solid\ network}$ is the electronic density of the solid network and $de_{pore\ fluid}$ the electronic density of the pore fluid and b_{th} the Thomson coefficient (b_{th} = 2,83. 10^{-13} cm).
The electronic density of the solid network was calculated using the equation (2):

$$de_{solid\ network} = \frac{d_{solid\ network} . \overline{Z_{solid\ network}} . N_a}{M_{solid\ network}} \qquad (2)$$

Where $d_{solid\ network}$ (g.cm^{-3}) is the density of the solid network (obtained by hydrostatic weighing), $Z_{solid\ network}$ the average number of electrons (based on the volume fractions of the silica, the alumina and the alkali), N_a the Avogadro number, $M_{solid\ network}$ the molar mass (based on the mass fractions of the silica, the alumina and the alkali).