

## Geopolymeric pastes with sodium tetraborate: study of the thickness for cementation of oilwells

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**Abstract** – Geopolymers have a high reactivity levels that promotes a faster thickening time of the geopolymeric pastes. This property makes this paste inappropriate to be applied in oilwell cementing operations. The objective of this work was to evaluate the effect of the variation of sodium tetraborate concentration in the thickening time of the geopolymeric pastes. As an conclusion, the sodium tetraborate increased the tickening time of the geopolymeric pastes.

Cementing operation consists of a very important work for the following drilling and completion operations of oilwell and has a great impact on the productivity of the oilwell [1]. The geopolymeric pastes made of metakaolinite showed a better performance of the properties studied such as compressive strength, pumping time, fluid loss control and viscosity. However, it is necessary to carry out others experiments in order to know the chemical stability in acid ambient of these cement materials and to figure out additives which can control the paste behavior, such as setting time and compressive strength [2]. Seen the use of tetraborate for cement odontologic and concerning to its properties in these cements have motivated the use of sodium tetraborate as retarder agent in geopolymeric pastes. In this case, using it as hardening retarder. Thus, the objective of this work was to study and characterize geopolymeric paste additivated with sodium tetraborate by the experiment Thickening Time. The pastes were constituted of metakaolinite, potassium silicate, potassium hydroxide and sodium tetraborate. The propertie evaluated was thickening time at the ambiente temperature (26,7 °C) and at specification temperature of the cement (52°C). The tests were carried out in accordance to the practical recommendations of the norm API RP 10B. The additivated pastes with sodium tetraborate modified the setting time of the geopolymeric pastes. The addition of this additive tripled the tickening time of the pastes. It was hereby concluded in this study that the sodium tetraborate can be used as a retarder in geopolymeric pastes for oilwell cementing.

**Table 1:** Thickening time of geopolymeric pastes additived with sodium tetraborate at ambient temperature (26,7°C) and 700 psi

	0%	1,0%	2,0%
0%	6 Uc	5 Uc	14 Uc
25%	13 Uc	15 Uc	14 Uc
50%	13 Uc	15 Uc	14 Uc
75%	16 Uc	20 Uc	16 Uc
50 Uc	306 min	320 min	400 min
100 Uc	323 min	336 min	406 min

**Table 2:** Thickening time of geopolymeric pastes additived with sodium tetraborate at the heated temperature (52°C) e 5000 psi

	0%	1,0%	2,0%	5,0%
0%	6 Uc	5 Uc	14 Uc	10 Uc
25%	6 Uc	5 Uc	17 Uc	10 Uc
50%	10 Uc	7 Uc	16 Uc	47 Uc
75%	14Uc	8 Uc	11 Uc	60 Uc
50 Uc	63 min	74 min	104 min	52 min
100 Uc	66 min	78 min	118 min	160 min

### References

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