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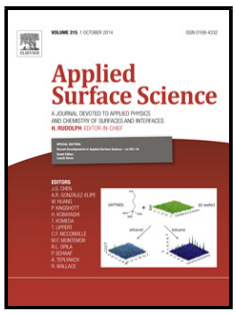

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Dissolution behaviour of model basalt fibres studied by surface analysis methods

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Highlights

Model basalt fibres were leached in NaOH solution.
The formation of a corrosion layers was observed and analysed by SEM/EDX.
Basalt compositions are able to form temporarily protective films.
The surface of basalt fibres is rich in Si and Al.

Abstract: New concepts of surface modifications aimed at the enhancement of alkali resistance of basalt fibres require research work on chemical composition of interacting surface layers as well as knowledge about fundamental processes of basaltic glass dissolution. Therefore, two model basalt fibres manufactured out of subalkaline and alkaline rock material were leached in NaOH solution at a temperature of 80 °C for up to 11 days. The formation of a corrosion shell was observed in both cases and was analysed by SEM/EDX. The model fibres out of subalkaline rocks show dissolution kinetic, which is two-staged, whereas the more alkaline fibre reflects a linear one. The complex composition of basalt fibre is detected by EDX and XPS. The surface of basalt fibres is rich in Si and Al. XPS high resolution spectra provide information on oxidation state of iron.
Keywords: Basalt fiber, Dissolution Kinetics, XPS, EDX