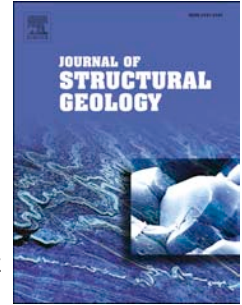


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Temperature constraints on microfabric patterns in quartzofeldspathic mylonites,
Ribeira belt (SE Brazil)

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1 Temperature constraints on microfabric patterns in quartzofeldspathic
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20 Keywords: TitaniQ geothermometry; high-temperature shear zones; microfabrics; EBSD; Ribeira belt

21 **Abstract**

22 Based on samples from the major high-temperature Três Rios-Além Paraíba-Pádua
23 transpressive shear zone in the Ribeira orogenic belt, Brazil, we discuss the
24 applicability of TitaniQ geothermometry to constrain peak temperature conditions
25 during high-temperature mylonitization of quartzofeldspathic rocks, and explore the
26 microfabrics formed at these conditions. We discuss various aspects of the TitaniQ
27 method and conclude that deformation occurred at temperatures ranging from 612 to
28 740 ± 20 °C in the studied segment of the shear zone. This high-temperature
29 deformation resulted in relatively large grain size, quartz ribbons and abundant
30 intracrystalline deformation. However, the CPO fabrics are weak, and microstructures
31 suggest that quartz deformation was accommodated by dynamic recrystallization
32 involving grain boundary migration with subsequent grain growth, and later some
33 subgrain rotation during exhumation. We relate the weak fabrics to diffusion
34 processes during or immediately after dynamic recrystallization and dislocation creep,
35 and to the effect of competing slip systems during deformation. In terms of rheology,
36 evidence for Dauphiné twinning in our samples suggest strain softening during
37 mylonitization, and we suggest that such twinning may add to the rheologically weak
38 nature of quartzo-feldspathic portions of hot middle to lower crust.

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