YBCO HTSC Bars for kA Range Current Leads, M. CARERA, J. FONTCUBERTA, X. FORNE, V. GOMIS, X. GRANADOS, B. MARTINEZ, X. OBRADORS, S. PINÖL and F. SANDIUMENGE, ICMAB, Campus UAB, 08193 Bellaterra, Spain - The potential of YBCO superconductors for the development of current leads has been hindered by the difficulties in the fabrication of long single domain bars where the critical current density can be much higher than the BSCCO counterpart. We have recently shown that through the use of additives, such as CeO_2, self sustained vertical bars can be directionally solidified and very long (8-10 cm) single domains can be fabricated with cross sections up to 0.1 cm^2 [1]. In this work we show that this technique can be improved to obtain bars up to 0.4 cm^2 able to carry a current higher than 2500 A measured in pulsed mode allowing the fabrication of kA range current leads for applications in current transmission to High Current Superconductor Magnets. Quality factors of these bars such as homogeneity, critical current, thermal conductivity, dependence of the critical current on the magnetic field and resistance of ohmic contacts are evaluated. The effect of the variation of the growing speed is also analysed by determination of the domain structure by both optical polarized microscopy and Hall scanning of the magnetic remanence allowing an optimization of the bars.

1 S. Pinöl et al., Appl. Phys. Lett., 65 ,1448 (1994).