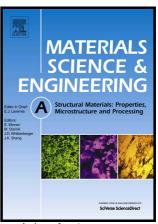
## Author's Accepted Manuscript

Strengthening mechanisms of nano-grained commercial pure titanium processed by accumulative roll bonding

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## ACCEPTED MANUSCRIPT

Strengthening mechanisms of nano-grained commercial pure titanium

processed by accumulative roll bonding

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**Abstract** 

Grain-refining process in commercial pure titanium was performed by room-temperature

accumulative roll bonding. The study on the microstructural evaluations showed a reduction

in grain size from about 45 µm in the untreated (annealed) sample to about 90 nm after six

cycles of accumulative roll bonding, a reduction factor of about 500 times. The yield strength

of the nano-grained commercially pure titanium after the sixth cycle, 799 MPa, was about

three times higher than that of the as-received sample, 284 MPa. Different strengthening

mechanisms during the accumulative roll bonding processing of the commercially pure Ti

were assessed, and the contribution of each mechanism to the yield strength improvement

was quantitatively calculated. The results showed that the calculated yield strength (834

MPa) for a six-cycle processed sample is close to the measured value (799 MPa).

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