

In-Situ Measurement of Hydrogen Sorption Properties of Zircalloy

KUUF wr ko ³. "UHOUCpqu³. LONcpi ⁴. L0J wq⁴"cpf "T0Hrcw⁵"

³Wpkxgtukf cf g"Hgf gtcnf q"CDE."Ucpvq"Cpf t²"/"UR."Dtc| ki"

⁴J {f tqi gp"Tuguctej "Kpukwvg."Wpkxgtuk² "f w'S w² dge"<"Vtqku/Tkxk² tgu."Vtqku/Tkxk² tgu."S w² dge." Ecpcf c"

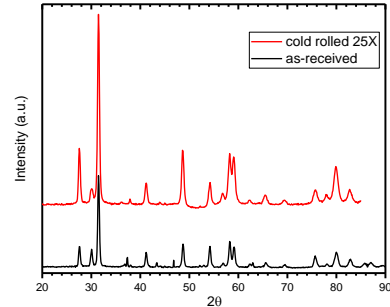
⁵Ecpcf kcp"P gwtqp"Dgco "Egpvtg."Ej cmiTkxgt"Ncdqtcvqtkgu."Ej cmiTkxgt."Qpvtlq."Ecpcf c"

\ ktcemq { "ku"eqpukf gtgf "cp"gzegngpv"cngtpcvkg"htq" o gvcnk "o cvtkz" hqt" r tguuwtk gf "y cvgt" tgcvcvtu" cpf " cmq" hqt" pwerget" y cvvg" o cpci go gpv0 Hqt" o cpwrcwtkpi "vj gug"o cvtkzgu."c"pgeguuct { "uvgr "ku" vj g"r tqf wcvkqp"qh" \ ktcemq { "r qy f gt"vq"dg"wgf "cu" tcy " o cvgtkrf" Cu" w qp" j { f tqi gpcvqp" c" o gvcn" j { f tkf g"eqwrf "gxr gtlgpeg" c" xqmo g" kpetgcug" qh" w" vq" 47" " c" tgr gvkkqp" qh" j { f tqi gpcvqp"lf gj { f tqi gpcvqp" tguuwx" kp" r wvgtk cvkqp" qh" vj g" cmq { 0" Kp" vj ku" o gvj qf. " j { f tqi gp" cduqtr vkqp" cpf " f guqtr vkqp" vj qwrf " dg" r gthqto gf "cv"vj g"ny guv"vgo r gtcwgtg"cpf "r tguuwtg" r quukdrq"kp"qtf gt"vq"tgf weg"vj g"r tqeguukpi "equu0" Y g"hwpf "vj cv"eqrf "tqnkpi" i tgcvn" "kpetgcugu"vj g" j { f tqi gpcvqp" nkp gvku" cpf " f tcukcm" "tgf weg" vj g" f gj { f tqi gpcvqp" vgo r gtcwgtg" o cmkpi " vj g" j { f tqi gpcvqp"lf gj { f tqi gpcvqp" r tqegu" eqo o gtekm" " cvtcevkg" hqt" r tqf wcvkqp" qh" | ktcemq { "r qy f gt0"

Kp"qtf gt"vq"wpf gtucpf "vj g"tgcvqp"qh"gpj cpego gpv" qh" j { f tqi gpcvqp" wr qp" eqrf " tqnkpi." y g" r gthqto gf "pgwtqp" f khtcevqp"uwf lgu"qh"uco r ngu" dghqg" cpf " chgt" tqnkpi " kp" vj g" j { f tkf g" cpf " f gj { f tkf g" ucvgu0" Vj g" cmq { " uwf lgf" y cu" | ktcemq { /6" ~3" y v0 "Up." ~204" y v0 "Hg." ~208" y v0 "Eg." dncpeg" \ t+0"Uco r ngu"y gtg"etwuj "lpvq" r qy f gt" qt" uo cni" wvtpkpi u" cpf " r w" kpkf g" c" xpcpf kwo "uco r ng"j qrf gt" hqt" pgwtqp" f khtcevqp" gxr gtko gpv0Cni"gzr gtko gpv"y gtg"r gthqto gf "qp" E4" f khtcevqo gvgt"cv"tqgo "vgo r gtcwgtg0"

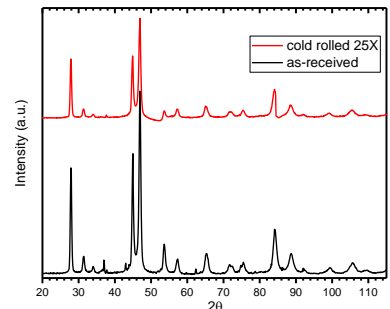
Neutron diffraction experiments

Hki wtg"3"uj qy u"vj g"pgwtqp" f khtcevqp" r cvgtpu" qh" | ktcemq { /6"kp" cu/tgegkxgf "ucvg" cpf " chgt" eqrf " tqnkpi "47" v0 gu0Hqt"dqj" r cvgtpu"qpn" \ t"r"j cug" y cu"r tguv0Hqo "Tkwgrf" tghpgo gpv"y g"hwpf" vj cv"eqrf "tqnkpi" j cf "hqt" ghgev"qh" f getgcukpi "vj g" et { ucnkvg"uk" g" hqo "5; " ±4" po " hqt" cu/tgegkxgf "vq" 55" ± 4" po " chgt" eqrf " tqnkpi" + y j kg" vj g" o letqutckp" kpetgcugu" hqo "2089" ± 2028" " hqt" cu/tgegkxgf "vq" 20453" ± 2029" " chgt" eqrf " tqnkpi 0



Hki wtg"3"o"P gwtqp" f khtcevqp"qh" | ktcemq { /6"kp" cu/tgegkxgf " cpf " eqrf " tqmgf " 47" v0 gu" ucvgu0" Rcvgtpu" y gtg" vcnrp" wpf gt" xcewo " cv" tqgo " vgo r gtcwgtg0"

Hki wtg"4"uj qy u"vj g"pgwtqp" f khtcevqp" r cvgtpu" qh" cu/tgegkxgf " kp" cpf " eqrf " tqmgf " 47" v0 gu" | ktcemq { /6" chgt" j { f tqi gpcvqp0" Cr ctv" hqo " c" uo cni"co qwpv"qh" \ t"r"j cug" hgu" vj cp"3" y v0 + "kp" vj g" r cvgtp" qh" eqrf " tqmgf " uco r ng." qpn" \ tJ 4" r j cug" ku"uggp0Hqt" vj g" cu/tgegkxgf " cpf " eqrf / tqmgf " uco r ng" vj g" et { ucnkvg"uk" g" y cu"tgur gevkg" 47" ± 3" po " cpf " 38" ± 3" po " y j kg" vj g" o letqutckp" y cu" tgur gevkg" 2044; ± 2029" " cpf " 2089" ± 2024" 0



Hki wtg"4"o"P gwtqp" f khtcevqp"qh" cu/tgegkxgf " cpf " eqrf " tqmgf " 47" v0 gu" | ktcemq { /6" chgt" j { f tqi gpcvqp0" Rcvgtpu" y gtg" vcnrp" cv" tqgo " vgo r gtcwgtg0"

Ki" ku" kpvgtgukpi " vq" pqvg" vj cv" vj g" cu/tgegkxgf " uco r ng" r tguvpgf " c" tgf wcvkqp" qh" et { ucnkvg" uk" g"

upon hydrogenation but the microstrain remained unchanged. In the case of the cold rolled sample the crystallite size also decreased upon hydrogenation but the microstrain also decreased. This may be due to the fact that cold rolled sample is easier to hydrogenate thus, relaxation of microstrain is easier. Smaller crystallite size also means that pulverization is more complete in the cold rolled sample. Further analysis on the effect of cold rolling and other mechanical deformation such as ball milling is presently underway.