High field performance of high strength Bi-2223 tape @4.2K

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DI-BSCCO Type HT

- Bare wire (Type H)
- Type HT (laminated wire)
  - Type HT-NX with Ni-alloy
  - Type HT-SS with Stainless steel
  - Type HT-CA with Cu-alloy

- Type HT is laminated with reinforcement tapes
- These tapes are firmly bonded with Type H (insert) by soldering
Topics: Performance @4.2K

- High field $I_c$
- Hoop stress test
- Double bend test
Topics: Performance @4.2K

- High field $I_c$
- Hoop stress test
- Double bend test
$I_c$ - B - T

**Type HT-NX, B //**

<table>
<thead>
<tr>
<th>Temperature (K)</th>
<th>Line Style</th>
</tr>
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<tbody>
<tr>
<td>4.2 K</td>
<td>Full circle</td>
</tr>
<tr>
<td>20 K</td>
<td>Light blue cross</td>
</tr>
<tr>
<td>30 K</td>
<td>Dark green point</td>
</tr>
<tr>
<td>40 K</td>
<td>Blue square</td>
</tr>
<tr>
<td>50 K</td>
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<tr>
<td>77.3 K</td>
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**Type HT-NX, B ⊥**

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$I_c - B(\theta) - T$

**Type HT-NX**

(Measured by NIMS @RRI/NZ)

H. Kitaguchi/NIMS, @MEM16, 22/March/2016
$I_c$-$B$ @4.2K

HT-NX, in liq. He
@ NHMFL, GHMFL, NIMS

(Measured by NIMS @Grenoble, NHMFL & NIMS)

H. Kitaguchi/NIMS, @MEM16, 22/March/2016
Topics: Performance @4.2K

- High field $I_c$
- Hoop stress test
- Double bend test
Hoop stress test: (1) procedure

Using one layer coil specimen, all test procedure was performed in liq.He bath.

O.D. = 108 mm
Wire length = 2 m
Voltage tap spacing (mm) = 340@V-1, 1021@V-2, 1701@V-3

Ref: Miyoshi et al., Supercond. Sci. Technol. 27 (2014) 025003
Hoop stress test: (2) $I_c$ and n-value

(Measured by NIMS @Grenoble)
Hoop stress test: (3) comparison

Ref: Miyoshi et al., Supercond. Sci. Technol. 27 (2014) 025003

(Measured by NIMS @Grenoble)
Topics: Performance @4.2K

- High field $I_c$
- Hoop stress test
- Double bend test
Double bend test: (1) procedure

$\text{I}_c$ measurement in liq. N, s.f.

Double bending @RT

$\text{I}_c$ measurement in liq. N, s.f.

$\text{I}_c$ measurement in liq. He, external field

bend. dia.: 70, 60, 50, 40, 38, 36, 34, 32 (mm)
Double bend test: (2) liq. N, s.f.
Double bend test: (3) liq. He, 10T(perp.)
Remarks: Bi-2223 HT-NX @4.2K

• High field $I_c$

  B // tape surface: >500A @31T
  B ⊥ tape surface: >400A @12T

• Hoop stress test

  Good homogeneity
  400 MPa

• Double bend test

  95% $I_c$ retention @77K: be careful