Contribution ID: **528** Type: **Invited Oral Presentation**

[Invited] Enhancing Flux Pinning of Y-Ba-Cu-O Superconducting Thin Films at ≤ 30 K and H ≥ 3 T

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The addition of many types of defects to YBa2Cu3O7-z (Y-Ba-Cu-O or YBCO) superconductor thin films have been studied by many groups world-wide, to enhance flux pinning and strongly increase critical current densities (Jcs). Since the first publications of this field in 2003 and 2004, over 6,200 citations have been listed for the subfield 'flux pinning YBCO', and the subfield 'flux pinning'has over 60,000 citations (source Google Scholar, 2015). Despite many excellent systems studied, there are still interesting types of defect additions, flux pinning mechanisms, and processing methodologies to explore. This paper will provide an introduction to this field, and focus on flux pinning to enhance Jcs at T ≤ 30K and high-fields H ≥ 3 Tesla. Additional emphasis will summarize studies in our lab from 2003 to 2016 on multiple YBCO+M+N systems (M,N < 20 Vol%), where systematic studies characterized the full Jc(T,B,θ) landscape with T = 5-77K, and H = 0–9T, and θ = 0-90°. It is increasing understood that optimized pinning microstructures are typically different for 5K than for 77K, and many examples of that will be shown. However we also will present an interesting YBCO+Y2BaCuO5 system that optimizes pinning for the full range T = 5-77K.

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