

Abstract Submitted
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CNT Twisted Yarns as Low Threshold Cold Electron Sources for Displays. ALEXANDER ZAKHIDOV, Moscow State University, RASHMY NANJUNDASWAMY, University of Texas at Dallas, MEI ZHANG, University of Texas at Dallas, SERGEY LEE, University of Texas at Dallas, RAY BAUGHMAN, University of Texas at Dallas, ALEXANDER OBRAZTSOV, Moscow State University, ANVAR ZAKHIDOV, University of Texas at Dallas, UTD TEAM, MSU TEAM — Carbon nanotubes are known as best field emitters of electrons, which emit at low threshold electric fields of $E_{thr} \sim 1-3 \text{ V}/\mu\text{m}$ with typical, stable current densities of $J \sim 100 \text{ mA}/\text{cm}^2$. Our team has recently created strong CNT fibers, yarns and ribbons by dry twist-spinning from oriented arrays of long MWCNTs prepared by CVD [1]. Here we show that such twisted yarns (TY) of typical diameters of $10 \mu\text{m}$ show phenomenally low $E_{thr} < 0.5 \text{ V}/\mu\text{m}$ with very high J and steep I-V curves. If used as cathode for phosphorescent screens the horizontally placed CNT TY FE show rather bright and uniform light emission. The high luminosity lamp and also numeric displays prototypes are created and their properties described. The mechanism of low threshold E_{thr} and high J is discussed in terms of high porosity structure and linear geometry of CNT TY. [1] M. Zhang, Ken Atkinson, Ray Baughman, Science (2004)

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