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NANODICING SINGLE CRYSTALLINE SILICON NANOSTRUCTURE ARRAYS FOR MICROSCOPY APPLICATION

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Here, we demonstrate a novel method for the sample preparation and analysis of single-crystal Si nanostructure arrays, the method is based on controlled and selective harvesting of the top-down carved of Si- nanostructures from a donor substrate, and their subsequent transfer into a sacrificial solid material block. Nanosectioning of the nanostructures-embedding block by ultramicrotome leads to the formation of size, shape, and orientation-controlled high quality nanoparticles/nanowire arrays. Additionally, we introduce a novel approach that enables transferring the sectioned arrays to various substrates or TEM grids, while preserving their orientation, and placing them on defined locations. This approach gives us the ability to perform an inner-structure crystallographic analysis with a statistical distribution of the whole array. Furthermore, it has a remarkable advantage of being fast and parallel method in compare to other time consuming sample preparation methods such as FIB.