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A new procedure for measuring particle length using the resistive pulse technique with irregular single polymer micropores PRESTON HINKLE, YINGHUA QIU, CRYSTAL YANG, ZUZANNA SIWY, Univ of California - Irvine, ARNOUT IMHOF, HENRIETTE BAKKER, Utrecht University — Application of the resistive pulse technique using single micro- and nanopores is an effective way of characterizing some physical properties of nanoparticles including charge, concentration, and volume. In this work, we expand the resistive pulse technique by describing a procedure that can be used to distinguish particles of different lengths, and even measure the length of individual nanoparticles. The method works by translocating small spherical "tracer" particles through a a polymer pore with non-uniform radius, providing a one-to-one mapping of the local pore radius to the position-dependent current pulse amplitude. By calculating a weighted moving average of the tracer's pulse over a varying number of ion-current position data points, the signal becomes convoluted in the same way a rod's signal is the convolution of the local pore radius along the rod's length. Comparison of the rods' and convoluted tracers' signals allows for calculation of the particle length. Successful results from application of the procedure to distinguish two types of silica rods are shown.

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