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# Nanoporous metal/metal-oxide composite prepared by one-step de-alloying AlNiCoYCu metallic glasses

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## Abstract

A bicontinuous nanoporous NiCoCuY metal/metal-oxide composite was fabricated by one-step de-alloying  $\text{Al}_{85-x}\text{Ni}_6\text{Y}_6\text{Co}_3\text{Cu}_x$  ( $x=1, 3$  and  $5$ ) metallic glasses in alkaline solutions. The electro-chemical performance of the nanoporous composites as binder-free electrodes has been evaluated. It is found that 3 at.% Cu addition can achieve the largest capacitance which is attributed to the increase in electric conductance. The capacitance of nanoporous composites can reach as high as  $1.22 \text{ F cm}^{-2}$  if the  $\text{Al}_{82}\text{Ni}_6\text{Y}_6\text{Co}_3\text{Cu}_3$  sample was de-alloyed in 4 M KOH for 50 min. Such a one-step strategy of de-alloying metallic glass not only generates a promising functional material for energy storage, but also provides a facile way for decreasing the resistance of electrode material.

**Key words:** Alloy; Amorphous structure; De-alloying; Cycle voltammetry; Galvanostatic

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