interface resulted from FIB-induced re-deposition (see inset to Fig. 2(a)) and the parasitic losses introduced through gallium ion implantation, as suggested in [35].

In conclusion, we have identified a very simple and robust epitaxial growth technique that yields large-area thin films of single-crystal gold ideally suited for the fabrication of high-quality metamaterials. Plasmonic losses here are capped only by the Ohm's law thus lowering the pump levels that would normally be required for loss compensation and lasing in gain-assisted metamaterials. Another very important advantage offered by epitaxial films is that they are ordered and naturally harder than their polycrystalline counterparts, and therefore enable to retain the full control over the nanofabrication process making it possible to produce very complex high-finesse metamaterial and plasmonic structures and circuits. With slight adjustment of the control parameters the epitaxial growth technique can also be employed for depositing monocrystals of other common plasmonic metals, such as aluminium, copper and silver, which all have their lattice constants similar to that of gold.

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