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Supplementary information for

Wrinkled stripes localized by cracks in metal films deposited on soft substrates

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Figure S1. Atomic force microscopy images (top) and corresponding profiles (bottom) for the old crack (left) and new crack (right) in the film with h = 90 nm. The arrows in (c) represent the peaks appeared at the crack edges. Note that the profile line 1 in (d) is shifted along the *z*-axis for clarity. It is shown that the film surfaces in and out of the old crack are both nearly flat and no obvious wrinkle can be detected. At the crack edges, two peaks can be seen clearly, which are induced by the elastic deformation of the soft foundation. For the new crack, however, the wrinkled stripe is localized in the vicinity of the crack. Furthermore, the PDMS foundation in the crack region is also wrinkled although its amplitude (profile line 2) is somewhat smaller than that in the film region (profile line 3). The wrinkles beside the two crack edges are connected with each other by wrinkling of the PDMS in the crack region and thus the straight wrinkles are always symmetry in appearance.



Figure S2. Atomic force microscopy images (top) and corresponding profiles (bottom) for the mode I (a), mode II (b) and mode III (c) cracks in the film with h = 225 nm. The arrows in (d-f) represent the peaks appeared at the crack edges. The insets in (d) and (e) are the sketches for old crack and mixed crack, respectively. Due to the elastic deformation of the soft substrate, each crack edge exhibits a peak. Mode I crack shows two peaks, similar to the results shown in Fig. S1c. Mode II and mode III cracks both show three peaks because there are three crack edges. Be similar to the result shown in Fig. S1d, the amplitude of the straight wrinkles in the film region is largest while it is smallest in the new crack region, as shown in Fig. S2g.



Figure S3. Morphological evolution of the localized wrinkled strip with increasing the film thickness taken by the optical microscopy. The data appearing in the bottom-left corners represent the film thickness. Each image has a size of 200×75 μm^2 .



Figure S4. Morphological evolution of the localized wrinkled strip with increasing the curing time taken by the optical microscopy. The data appearing in the bottom-right corners represent the curing time of the PDMS substrate. Each image has a size of $250 \times 100 \ \mu\text{m}^2$.



Figure S5. Cross-section profile of the sample: an iron film sputtering deposited on the PDMS foundation which was spin-coated onto a glass slide. The thickness of the PDMS layer is about $15 \mu m$.