van Ingen, Fastenau, and Mittemeijer Reply: The experimental data presented in the Comment [1] by Krebs and Störmer agree with our observations: see Fig. 2 of the Comment and Fig. 4 of our Letter. Apparently, Krebs and Störmer propose a different interpretation. We respond as follows.

The conclusion of the Comment is the suggestion that the x-ray diffraction (XRD) peak positions that we observed for the $\text{Ag}_x\text{Ni}_{1-x}$ solid solution phase in the laser ablation deposited (LAD) films were shifted drastically by defects in our films. (Pure Ag and pure Ni phases are also present; these result from droplets and partial demixing of the solid solution phase; see IV A and B of Ref. [2].) These defects would cause “strongly enlarged lattice spacings” and therefore the lattice parameters as measured would not be indicative for the composition of the solid solution phase. The defects are said to originate from “the high kinetic energy of the deposited particles (of up to more than 100 eV, etc.) and the high instantaneous growth rate.” However, this assertion does not hold for the following reasons.

(1) Molecular dynamics simulations showed that the impact of particles with a kinetic energy of up to 100 eV causes defects only in the first few atomic layers of a target [3]. Recovery or relaxation of the LAD AgNi films occurs during the growth process [2]. The XRD data originate from the whole LAD film. (The LAD film thickness is 100–500 nm.) Hence, even if kinetic energies as high as claimed in the Comment would occur (which is very unlikely at the relatively low fluences

applied; the overwhelming majority of the ablated species have a kinetic energy of a few eV [4,5]), it is extremely unlikely that sufficient defects would be present to explain the lattice-parameter shift observed.

(2) XRD data obtained in our work from pure Ag and pure Ni LAD films (see Ref. [2]) show that the lattice parameters of these films agree with the literature data for pure Ag and pure Ni solids, apart from the minor effect discussed next under point 3. Hence, “strongly enlarged lattice spacings” do not occur in these cases, whereas the interpretation given in the Comment would necessitate this. The result is fully compatible with our interpretation that the lattice-parameter shift observed for alloy films is caused by solid solution formation, and thus no lattice-parameter shift should occur if elemental films are produced.

(3) A small shift in the lattice parameter (an order of magnitude smaller than the one discussed) can be caused by the presence of (macro)stress in the LAD films. In our work we determined these stresses quantitatively for LAD AgNi and CuNi films [2]. These stresses explain quantitatively the difference between the lattice-parameter data for the solid solution phase as measured and as predicted using Vegard’s law. This is the explanation for the “strongly enlarged lattice spacings” discussed in the Comment.

Hence, there is no reason to modify our conclusion with respect to the supersaturation attained in our LAD films.

Finally, as a response to a side remark by Krebs and Störmer [1], we add an example, shown in Fig. 1, of an XRD pattern of a LAD AgNi film, prepared as described in Ref. [2], showing the {111} reflection of the $\text{Ag}_x\text{Ni}_{1-x}$ solid solution phase having a peak maximum corresponding with 42 at. % Ag in solid solution according to the Vegard relation shown in Fig. 10a of Ref. [2].

FIG. 1. XRD diffractogram (Cu $K\alpha$ radiation) showing the {111} reflection of pure Ag, the combined {200} and {111} reflections of pure Ag and pure Ni, respectively, and the prominent, broad (see Table III in Ref. [2], {111} reflection of the $\text{Ag}_x\text{Ni}_{1-x}$ solid solution phase. The peak position of the $\text{Ag}_x\text{Ni}_{1-x}$ {111} reflection occurs at 41.58° 2θ (profile fitting as described in Ref. [2] which indicates according to Fig. 10a of Ref. [2] that 42 at. % Ag is dissolved.

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