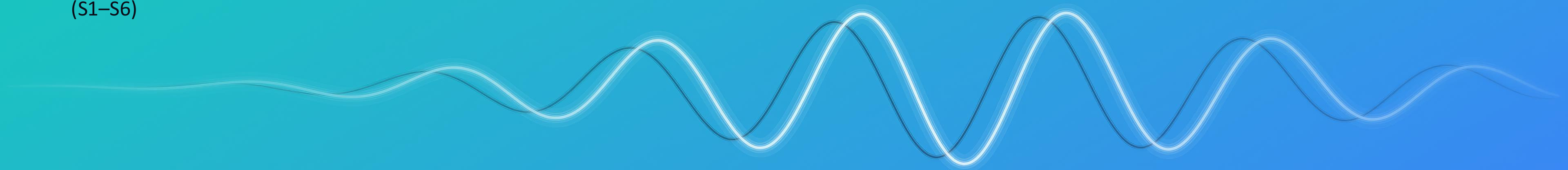


Phazic reproduces a 1310 nm VCSEL Bragg mirror

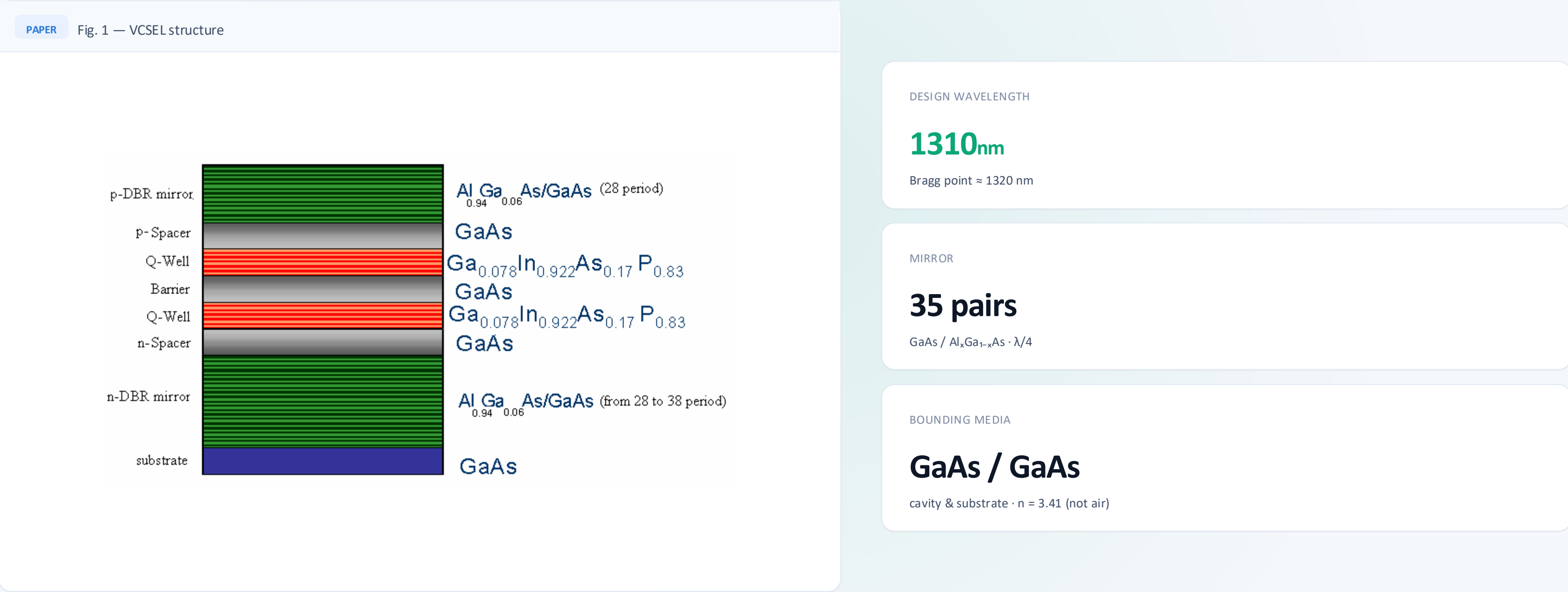
Figure-for-figure against Manaf et al., “Design & Optimization of DBR
Optimization of DBR for 1310 nm VCSELs” — all six mirrors (S1–S6)
(S1–S6)



THE REFERENCE

A published 1310 nm VCSEL DBR design

Manaf et al. design the n-DBR mirror of a 1310 nm VCSEL and report its reflectance for six material pairs. Fig. 2 is the mirror alone — each a 35-period quarter-35-period quarter-wave stack bounded by GaAs on both sides.



THE SIX MIRRORS

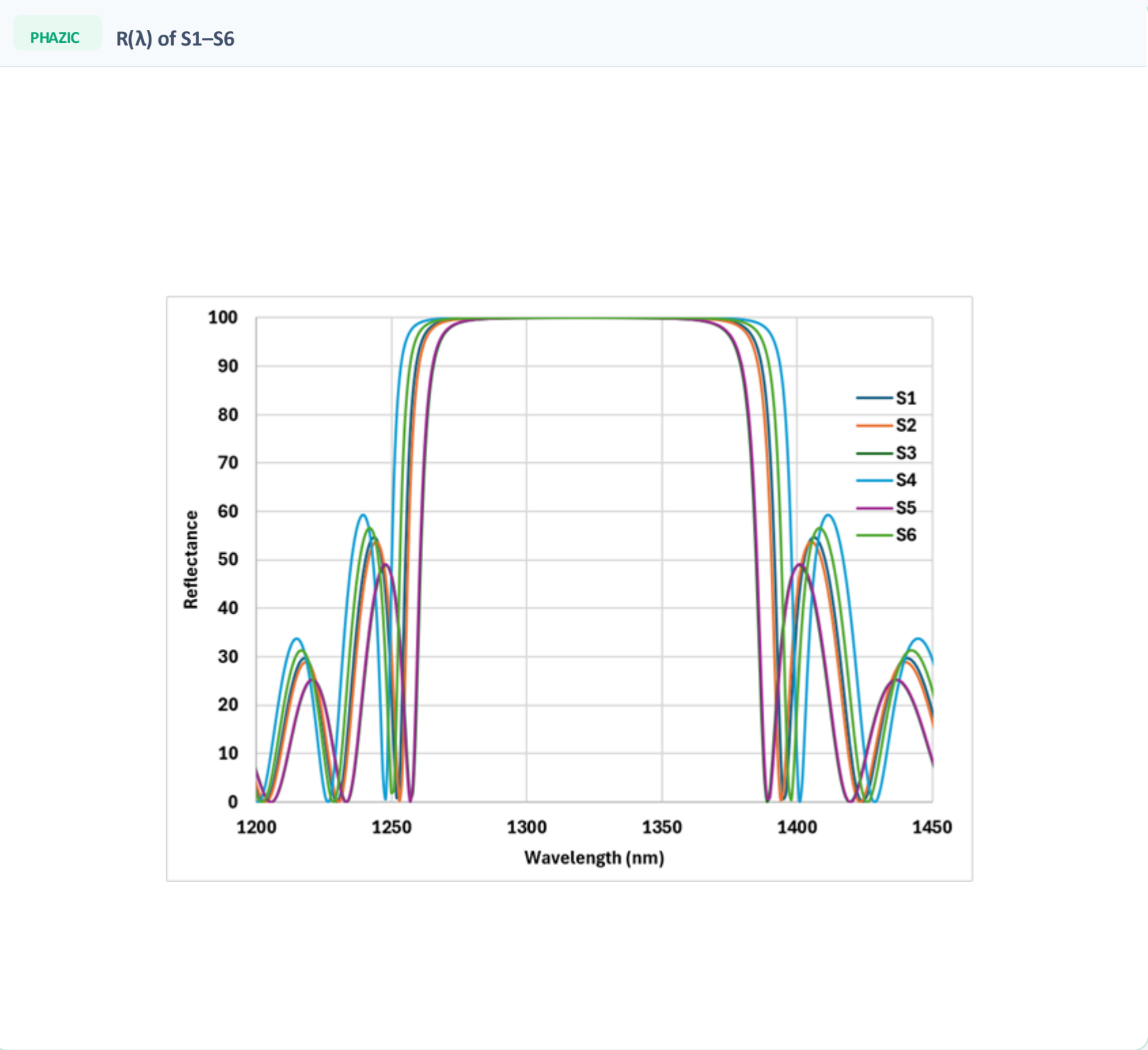
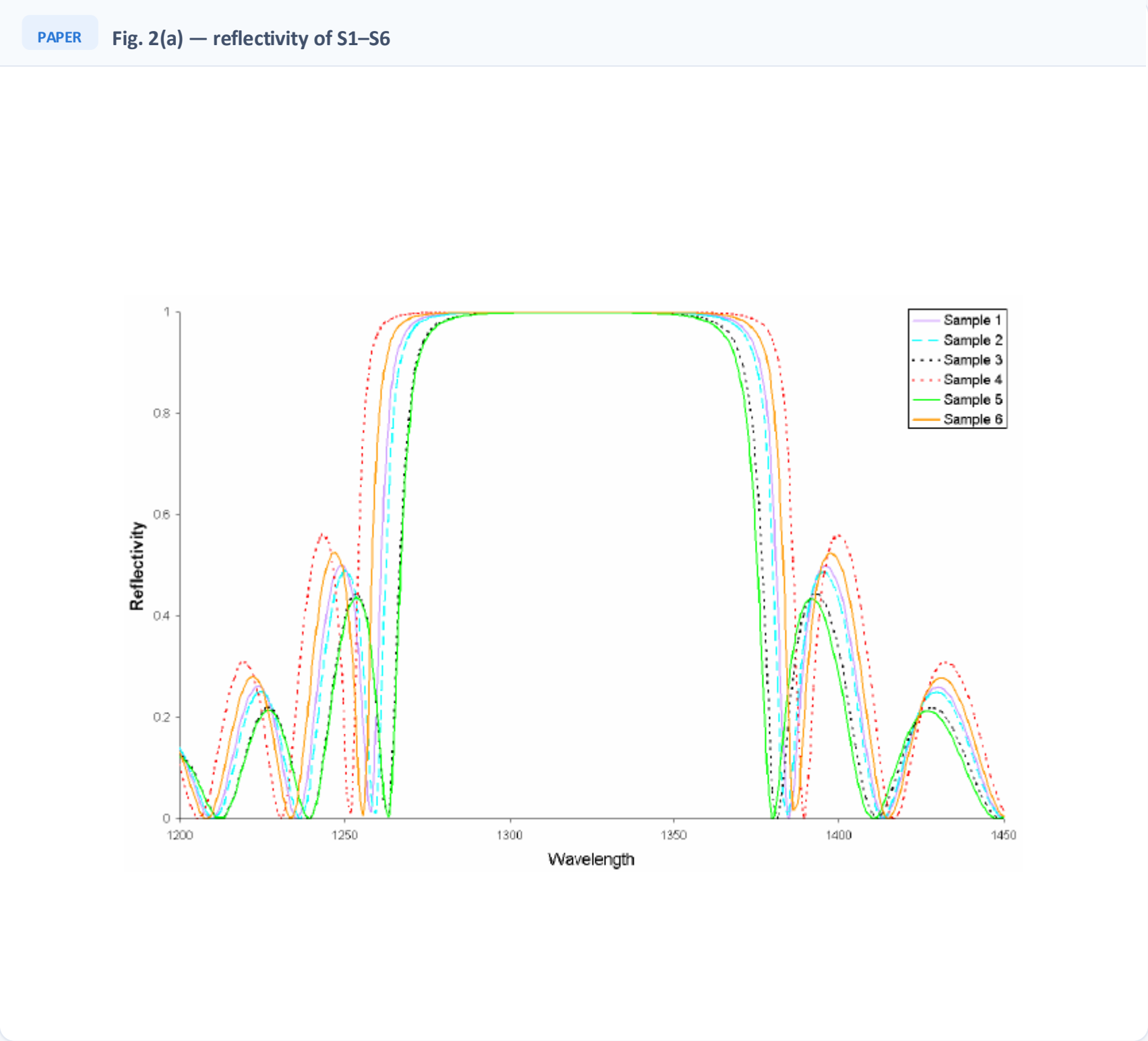
Same stack, six material pairs—one variable: Δn

Each is a 35-period $\lambda/4$ mirror; they differ only in the low-index layer. The index contrast Δn sets the stop-band width and peak reflectivity.

SAMPLE	HIGH-INDEX LAYER (H)	LOW-INDEX LAYER (L)	Δn
S4	GaAs $n=3.41$	AlAs $n=2.910$	0.500
S6	GaAs $n=3.41$	Al _{0.94} Ga _{0.06} As $n=2.935$	0.475
S1	GaAs $n=3.41$	Al _{0.9} Ga _{0.1} As $n=2.952$	0.458
S2	GaAs $n=3.41$	Al _{0.88} Ga _{0.12} As $n=2.960$	0.450
S5	GaAs $n=3.41$	Al _{0.8} Ga _{0.2} As $n=2.997$	0.413
S3	Al _{0.1} Ga _{0.9} As $n=3.36$	Al _{0.9} Ga _{0.1} As $n=2.952$	0.404

→ Δn ordering S4 > S6 > S1 > S2 > S5 > S3 sets stop-band width and peak reflectivity — exactly the ranking that appears in Fig. 2.

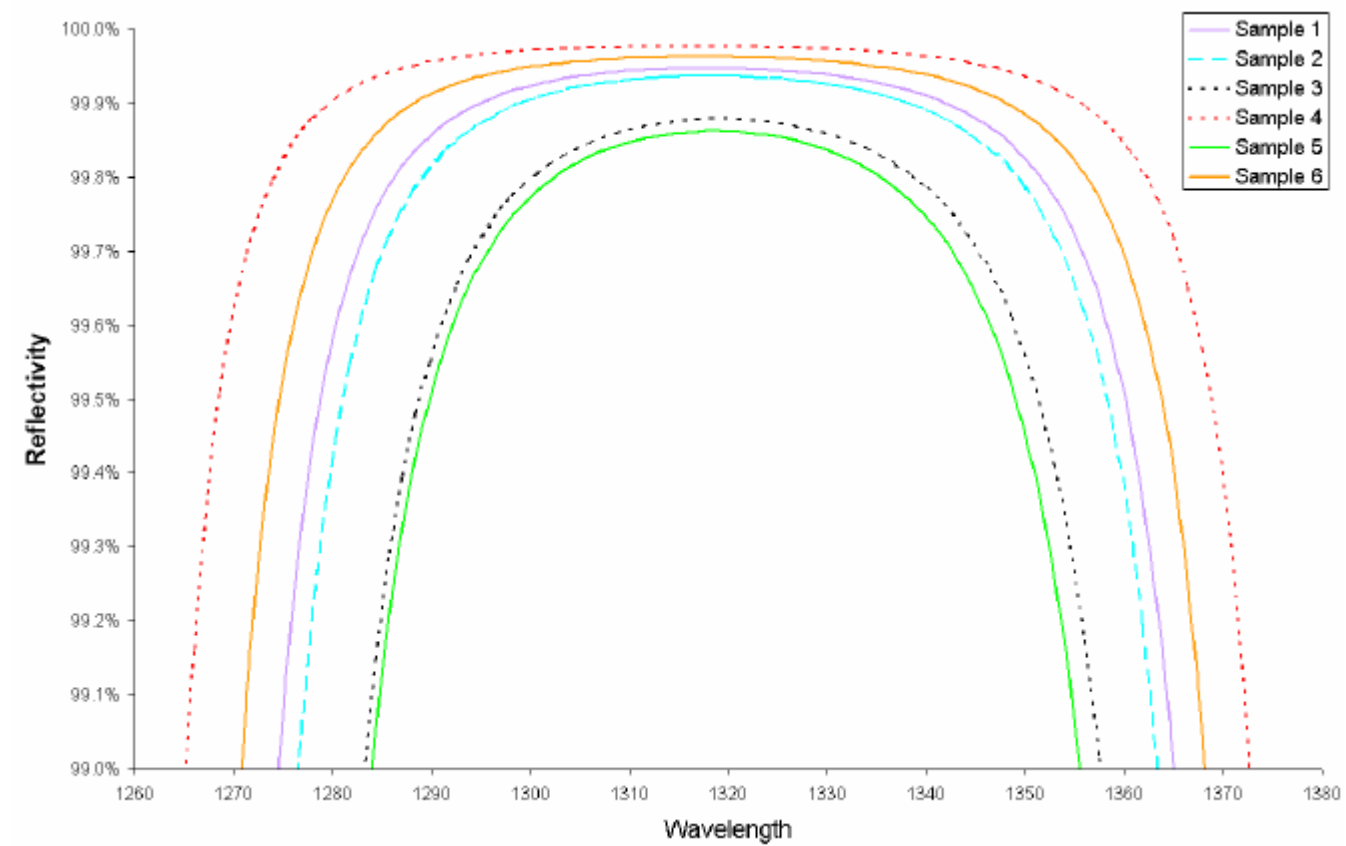
FIGURE 2(A) Reflectance $R(\lambda)$, 1200–1450 nm



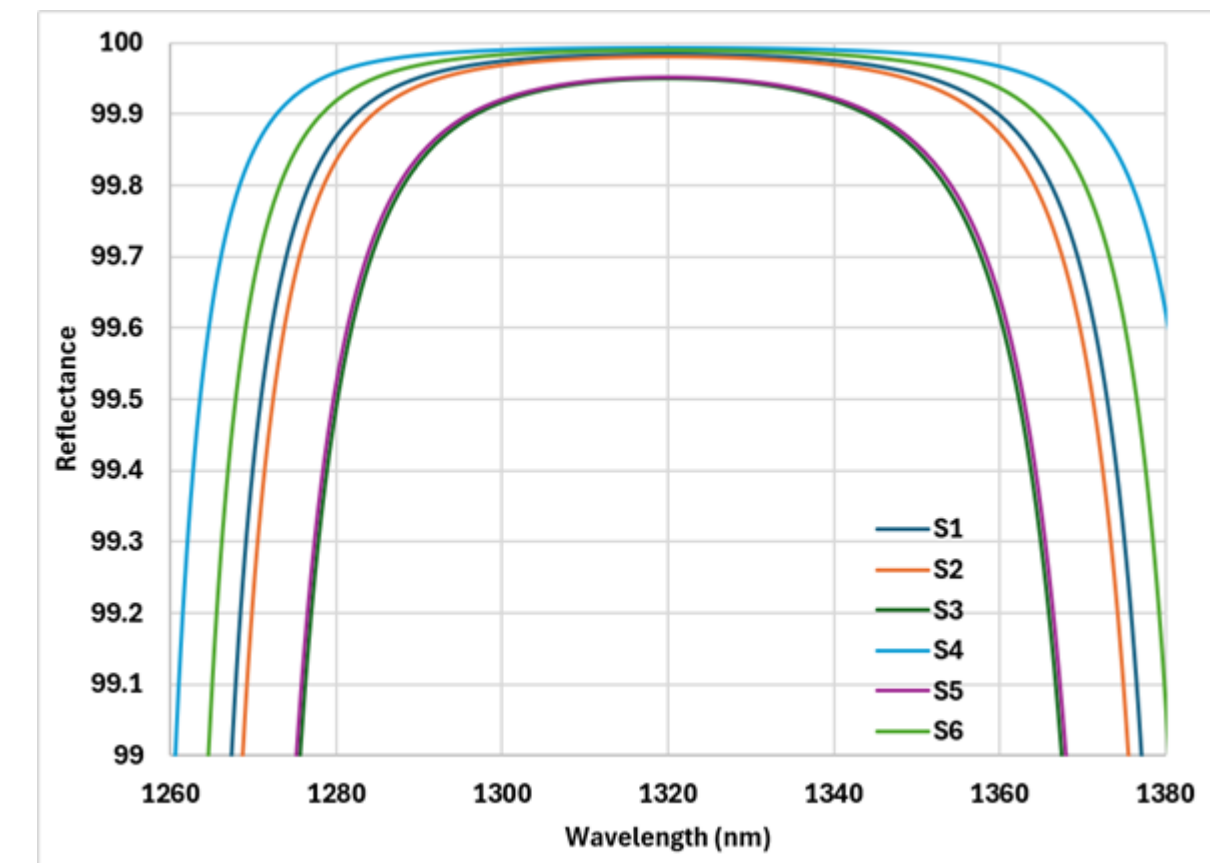
✓ Same flat >99% stop-band, the same side-lobe envelope with minima touching zero, and the same S4-widest → S3/S5-narrowest ordering.

FIGURE 2(B) Stop-band dose-up, 99–100%

PAPER Fig. 2(b) —dose-up 99.0–100.0%



PHAZIC close-up 99–100%



✓ The dome peaks at ≈ 1320 nm — the Bragg point — so R at the 1310 nm design point sits just below Rmax, for every sample.

THE NUMBERS AGREE

Peak reflectivity and stop-band width, sample by sample

SAMPLE	PHAZIC R@1310	PAPER R@1310	PHAZIC RMAX	PAPER RMAX	PHAZIC Δλ (NM)	PAPER Δλ
S4	99.9933	99.9760	99.9939	99.9982	124	131.5
S6	99.9877	99.9611	99.9890	99.9968	115	126.5
S1	99.9815	99.9439	99.9835	99.9952	109	121.4
S2	99.9777	99.9318	99.9801	99.9432	106	120.3
S5	99.9463	99.8483	99.9524	99.8617	92	110.0
S3	99.9430	99.8649	99.9496	99.8792	91	108.1

✓ Ranking matches exactly — **S4** > **S6** > **S1** > **S2** > **S5** > **S3** . Absolute R runs ~0.02–0.10% higher only because these sessions are lossless (k = 0); the paper includes doped-material absorption.

THE VERDICT

Independent solver, same mirror physics.

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mirrors reproduced in shape, Bragg point & side-lobes.
lobes.

>99.9%

peak stop-band reflectivity, matched sample by sample.
sample.

S4>S6>S1>S2>S5>S3

the Δn ranking, reproduced exactly.

Ref: Manaf et al. · DBR for 1310 nm VCSELs · TM R&D