Eksma Optics

WHITE PAPER

A proven 1 µm HR recipe doesn’t scale to 2.94 µm

HR coating development on Er:YAG laser crystals

Otas Dovydėnas, PhD. c., R&D Solutions Manager

SWIPE →

Eksma Optics

THE PROBLEM

At 2940 nm, every loss counts

01 Self-terminating transition

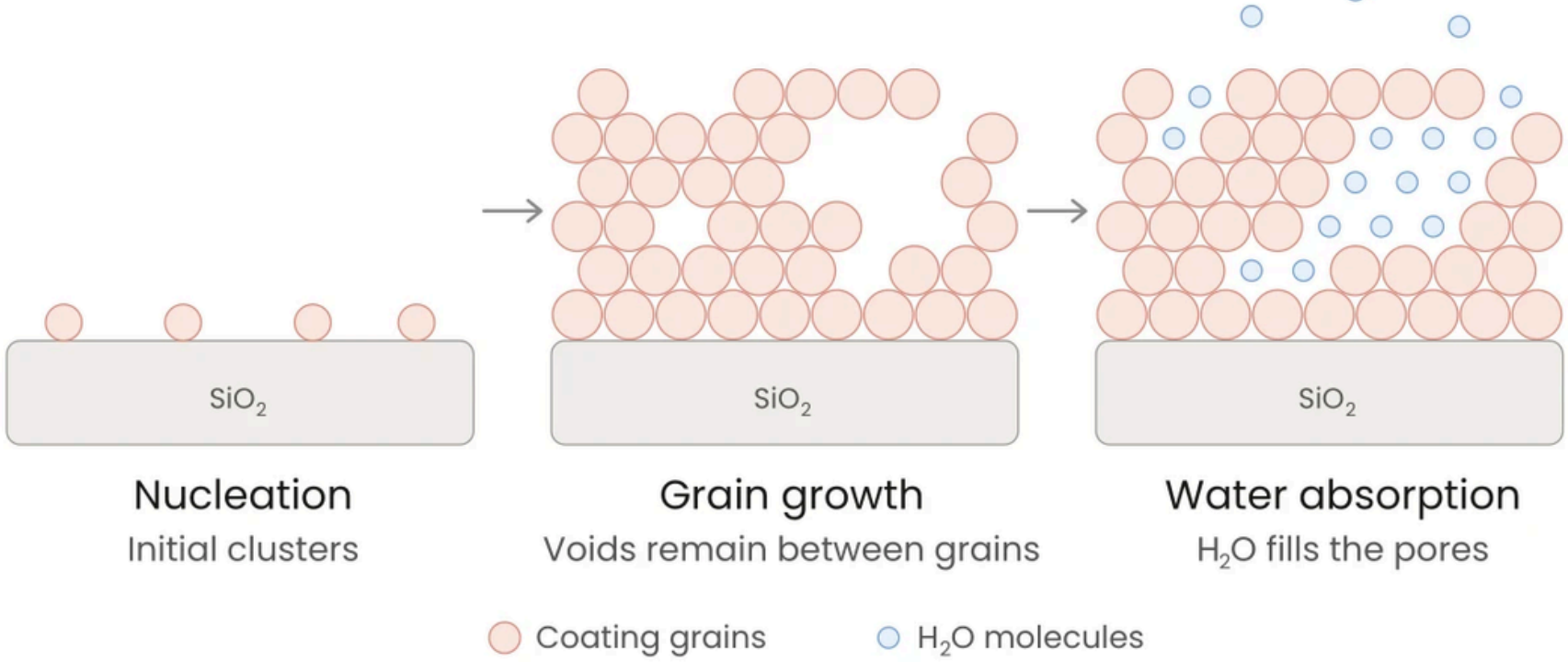
The lower laser level lives 2 ms, the upper one 0.1 ms. Inversion is already limited, so any parasitic loss in a mirror compounds directly.

02 OH- absorption

Residual hydroxyl groups absorb right across 2.7–3.0 µm.

03 Porous films

Conventional e-beam coatings leave voids that fill with atmospheric moisture.



Eksma Optics

THE APPROACH

TiO_2/SiO_2 + ion-assisted deposition

01 **High index contrast**

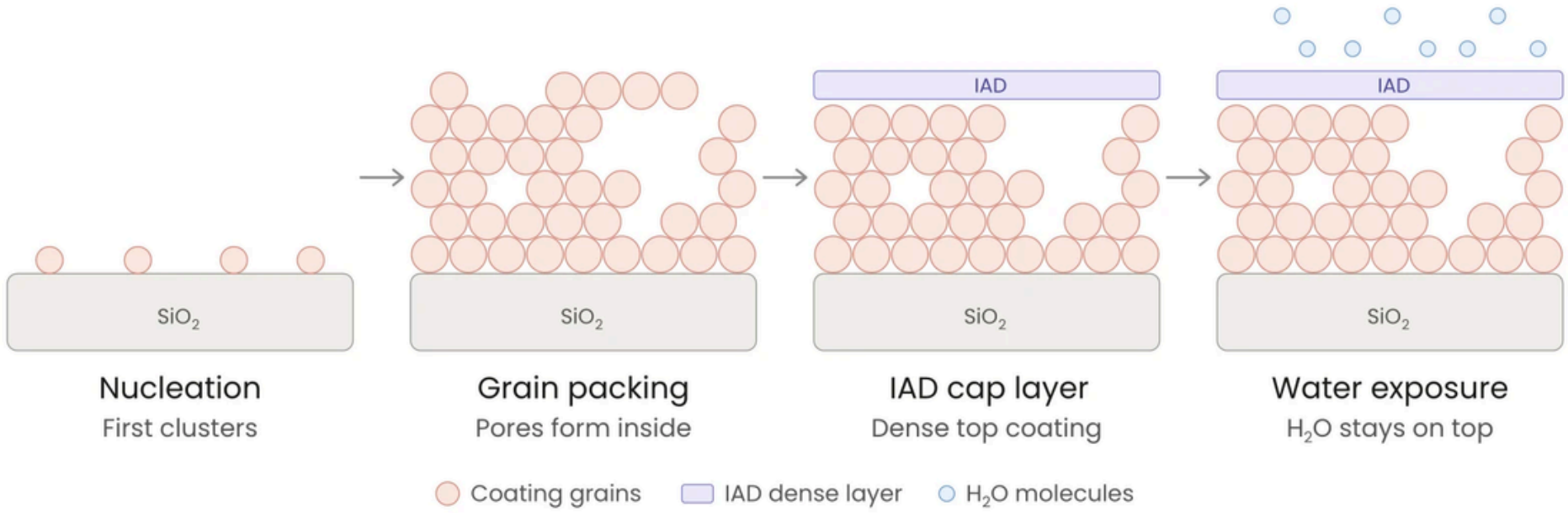
TiO_2 (n ≈ 2.2–2.4) against SiO_2 (n ≈ 1.42): fewer layers, less cumulative absorption.

02 **IAD seals the pores**

A densified layer closes off the porous structure, so moisture stays on the surface.

03 **E-beam + IAD, not IBS**

In EKSMA Optics' experience, IBS is more prone to OH- incorporation at 2.94 µm.

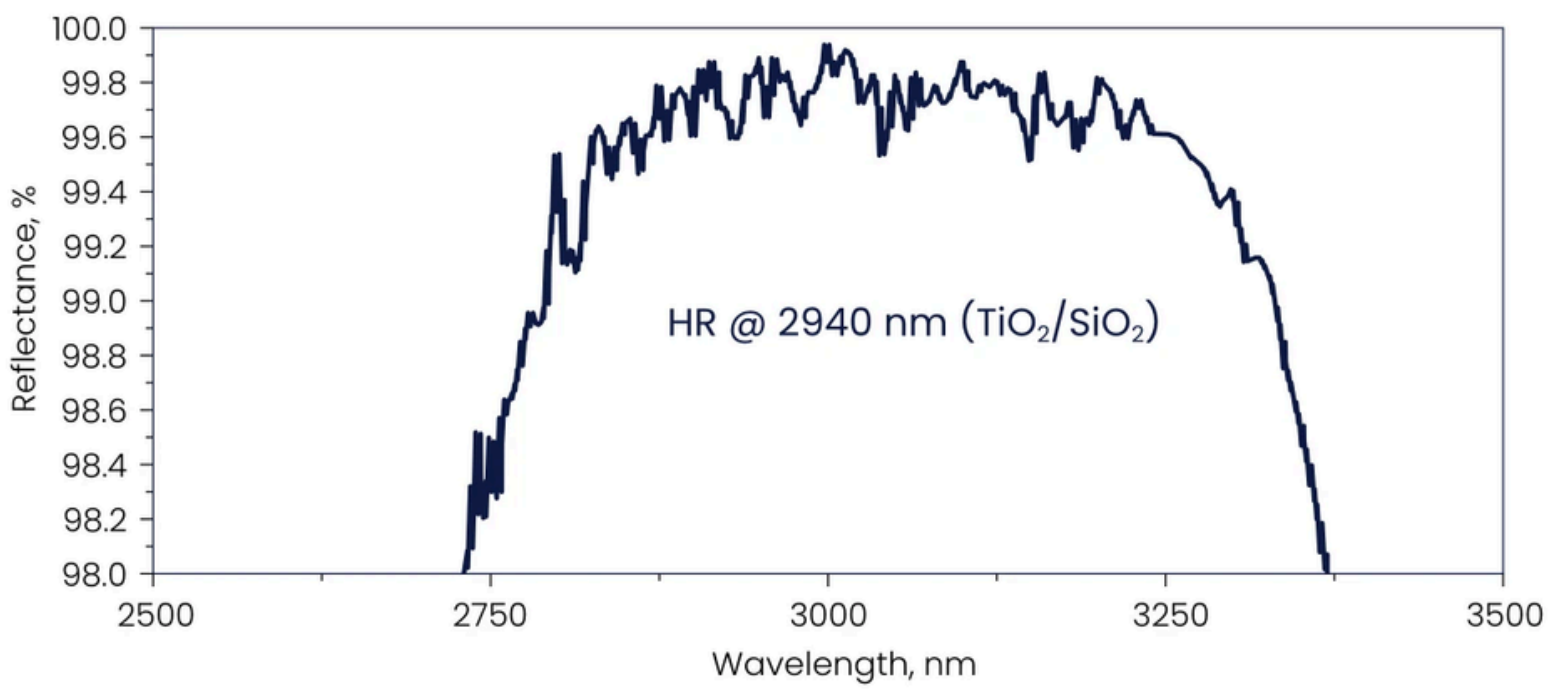


THE RESULT

R > 99.8%

@ 2940 nm, measured on an EKSMA Optics TiO_2/SiO_2 HR coating with IAD

Read the full white paper →
eksmaoptics.com/cp/er-yag-hr-coatings



Eksma Optics