On the last Hilbert-Samuel coefficient

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In 1978 Lipman presented a proof of the existence of a desingularization for any excellent surface. The strategy of Lipman's proof is based on the finiteness of the number $H(R)$, defined as the supreme of the second Hilbert-Samuel coefficient $e_2(I)$, where I range the set of normal $\mathbf{m}$-primary ideals of a Noetherian complete local ring $(R, \mathbf{m})$. On the other hand Huckaba and Huneke proved that if I is a $\mathbf{m}$-primary ideal of a two dimensional Cohen-Macaulay local ring $(R, \mathbf{m})$ such that I^n is integrally closed for $n \gg 0$, in particular if I is normal, then the associated graded ring of R with respect to I^n is Cohen-Macaulay for $n \gg 0$. The problem studied in the talk is the extension of the result of Lipman on $H(R)$ to $\mathbf{m}-$primary ideals I of a d-dimensional Cohen-Macaulay ring R such that the associated graded ring of R with respect to I^n is Cohen-Macaulay for $n \gg 0$