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ON THE COHEN-MACAULAYFICATION OF CERTAIN BUCHSBAUM RINGS

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§1. Introduction

Let A be a Noetherian local ring of dimension d and with maximal ideal m. Then A is called Buchsbaum if every system of parameters is a weak sequence. This is equivalent to the condition that, for every parameter ideal q, the difference $\ell_A(A/q) - e_A(q)$ is an invariant $I(A)$ of A not depending on the choice of q. (See Section 2 for the detail.) The concept of Buchsbaum rings was introduced by Stückrad and Vogel [8], and the theory of Buchsbaum singularities is now developing (c.f. [6], [7], [9], [10], and [12]).

Recently the author and Shimoda [1] have discovered that certain Buchsbaum rings are characterized by the behaviour of the Rees algebras of parameter ideals. The purpose of our paper is to ask for another criterion of such kind of Buchsbaum rings.

Together with that of [1] our result is stated as follows.

THEOREM (1.1). *Let $Q(A)$ be the total quotient ring of A. Then the following conditions are equivalent.*

(1) *A is a Buchsbaum ring and $H_m^i(A) = (0)$ for $i \neq 1, d$.*

(2) *The Rees algebra $R(q) = \bigoplus_{i \geq 0} q^i$ is a Cohen-Macaulay ring for every parameter ideal q of A.*

(3) *There is a Cohen-Macaulay intermediate ring B between A and $Q(A)$ such that* (a) *B is of finite type as an A-module,* (b) $\dim B_n = d$ *for every maximal ideal n of B, and* (c) *$mB \subset A$.*

In this case, if $d \geqq 2$, B is uniquely determined and $H_m^1(A) = B/A$. Here $H_m^i(*)$ denotes the local cohomology functor. The equivalence of the statements (1) and (2) is the main result of [1]. The last assertion and the equivalence of the statements (1) and (3) are new results of the present

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